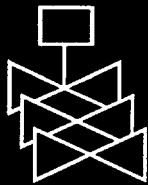
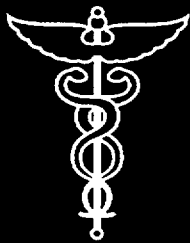
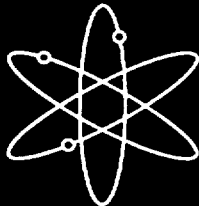
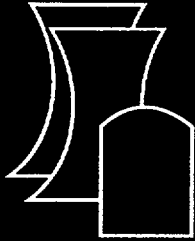


# **Standard Technical Specifications Westinghouse Plants**



**Specifications**

U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, DC 20555-0001



# **Standard Technical Specifications Westinghouse Plants**

## **Specifications**

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Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001**



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## PREFACE

This NUREG contains the improved Standard Technical Specifications (STS) for Westinghouse plants. Revision 2 incorporates the cumulative changes to Revision 1, which was published in April 1995. The changes reflected in Revision 2 resulted from the experience gained from license amendment applications to convert to these improved STS or to adopt partial improvements to existing technical specifications. This publication is the result of extensive public technical meetings and discussions among the Nuclear Regulatory Commission (NRC) staff and various nuclear power plant licensees, Nuclear Steam Supply System (NSSS) Owners Groups, and the Nuclear Energy Institute (NEI). The improved STS were developed based on the criteria in the Final Commission Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors, dated July 22, 1993 (58 FR 39132), which was subsequently codified by changes to Section 36 of Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.36) (60 FR 36953). Licensees are encouraged to upgrade their technical specifications consistent with those criteria and conforming, to the practical extent, to Revision 2 to the improved STS. The Commission continues to place the highest priority on requests for complete conversions to the improved STS. Licensees adopting portions of the improved STS to existing technical specifications should adopt all related requirements, as applicable, to achieve a high degree of standardization and consistency.

The Table of Contents is now a Table of Contents / Revision Summary where the revision number and date are listed for each specification and bases, in lieu of traditional page numbers. Each limiting condition for operation (LCO) starts with page 1, with a specification, e.g., "2.0" or bases "B 2.0" number prefix. Subsequent approved revisions to sections will be noted in the table of contents, as well as on each affected page, using a decimal number to indicate the number of revisions to that section, along with the date, e.g., (Rev 2.3, 04/01/01) indicates the third approved change and date since Revision 2.0 was published. Additionally, the final page of each LCO section will be a historical listing of the changes affecting that section. This publication will be maintained in electronic format. Subsequent revisions will not be printed in hard copy. Users may access the subsequent revisions to the STS in the PDF format at (<http://www.nrc.gov/NRR/sts/sts.htm>). This Web site will be updated as needed and the contents may differ from the last printed version. Users may print or download copies from the NRC Web site.

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The information collections contained in this NUREG are covered by the requirements of 10 CFR Part 50, which were approved by the Office of Management and Budget, approval number 3150-0011.

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## 1.0 USE AND APPLICATION

### 1.1 Definitions

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#### - NOTE -

The defined terms of this section appear in capitalized type and are applicable throughout these Technical Specifications and Bases.

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<u>Term</u>	<u>Definition</u>
ACTIONS	ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
ACTUATION LOGIC TEST	An ACTUATION LOGIC TEST shall be the application of various simulated or actual input combinations in conjunction with each possible interlock logic state required for OPERABILITY of a logic circuit and the verification of the required logic output. The ACTUATION LOGIC TEST, as a minimum, shall include a continuity check of output devices.
AXIAL FLUX DIFFERENCE (AFD)	AFD shall be the difference in normalized flux signals between the [top and bottom halves of a two section excore neutron detector].
CHANNEL CALIBRATION	A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for channel OPERABILITY. Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an in-place qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps.
CHANNEL CHECK	A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.

## 1.1 Definitions

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CHANNEL OPERATIONAL TEST (COT)	A COT shall be the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify OPERABILITY of all devices in the channel required for channel OPERABILITY. The COT shall include adjustments, as necessary, of the required alarm, interlock, and trip setpoints required for channel OPERABILITY such that the setpoints are within the necessary range and accuracy. The COT may be performed by means of any series of sequential, overlapping, or total channel steps.
CORE ALTERATION	CORE ALTERATION shall be the movement of any fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.
CORE OPERATING LIMITS REPORT (COLR)	The COLR is the unit specific document that provides cycle specific parameter limits for the current reload cycle. These cycle specific parameter limits shall be determined for each reload cycle in accordance with Specification 5.6.5. Plant operation within these limits is addressed in individual Specifications.
DOSE EQUIVALENT I-131	DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcuries/gram) that alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in [Table III of TID-14844, AEC, 1962, "Calculation of Distance Factors for Power and Test Reactor Sites," or those listed in Table E-7 of Regulatory Guide 1.109, Rev. 1, NRC, 1977, or ICRP 30, Supplement to Part 1, page 192-212, Table titled, "Committed Dose Equivalent in Target Organs or Tissues per Intake of Unit Activity"].
$\bar{E}$ - AVERAGE DISINTEGRATION ENERGY	$\bar{E}$ shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives > [15] minutes, making up at least 95% of the total noniodine activity in the coolant.

## 1.1 Definitions

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### ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.

### LEAKAGE

LEAKAGE shall be:

#### a. Identified LEAKAGE

1. LEAKAGE, such as that from pump seals or valve packing (except reactor coolant pump (RCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank,
2. LEAKAGE into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary LEAKAGE, or
3. Reactor Coolant System (RCS) LEAKAGE through a steam generator (SG) to the Secondary System;

#### b. Unidentified LEAKAGE

All LEAKAGE (except RCP seal water injection or leakoff) that is not identified LEAKAGE, and

#### c. Pressure Boundary LEAKAGE

LEAKAGE (except SG LEAKAGE) through a nonisolable fault in an RCS component body, pipe wall, or vessel wall.

## 1.1 Definitions

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MASTER RELAY TEST	A MASTER RELAY TEST shall consist of energizing each required master relays in the channel required for channel OPERABILITY and verifying the OPERABILITY of each required master relay. The MASTER RELAY TEST shall include a continuity check of each associated required slave relay. The MASTER RELAY TEST may be performed by means of any series of sequential, overlapping, or total steps.
MODE	A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.
OPERABLE - OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
PHYSICS TESTS	<p>PHYSICS TESTS shall be those tests performed to measure the fundamental nuclear characteristics of the reactor core and related instrumentation. These tests are:</p> <ul style="list-style-type: none"><li>a. Described in Chapter [14, Initial Test Program] of the FSAR,</li><li>b. Authorized under the provisions of 10 CFR 50.59, or</li><li>c. Otherwise approved by the Nuclear Regulatory Commission.</li></ul>
PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)	The PTLR is the unit specific document that provides the reactor vessel pressure and temperature limits, including heatup and cooldown rates and the LTOP arming temperature, for the current reactor vessel fluence period. These pressure and temperature limits shall be determined for each fluence period in accordance with Specification 5.6.6. Plant operation within these operating

## 1.1 Definitions

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PRESSURE AND TEMPERATURE LIMITS REPORT (continued)

	limits is addressed in LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," and LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."
QUADRANT POWER TILT RATIO (QPTR)	QPTR shall be the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of [2893] MWt.
REACTOR TRIP SYSTEM (RTS) RESPONSE TIME	The RTS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RTS trip setpoint at the channel sensor until loss of stationary gripper coil voltage. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.
SHUTDOWN MARGIN (SDM)	<p>SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming:</p> <ul style="list-style-type: none"><li>a. All rod cluster control assemblies (RCCAs) are fully inserted except for the single RCCA of highest reactivity worth, which is assumed to be fully withdrawn. However, with all RCCAs verified fully inserted by two independent means, it is not necessary to account for a stuck RCCA in the SDM calculation. With any RCCA not capable of being fully inserted, the reactivity worth of the RCCA must be accounted for in the determination of SDM, and</li><li>b. In MODES 1 and 2, the fuel and moderator temperatures are changed to the [nominal zero power design level].</li></ul>

## 1.1 Definitions

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SLAVE RELAY TEST	A SLAVE RELAY TEST shall consist of energizing each required slave relays in the channel required for channel OPERABILITY and verifying the OPERABILITY of each required slave relay. The SLAVE RELAY TEST shall include a continuity check of associated required testable actuation devices. The SLAVE RELAY TEST may be performed by means of any series of sequential, overlapping, or total steps.
STAGGERED TEST BASIS	A STAGGERED TEST BASIS shall consist of the testing of one of the systems, subsystems, channels, or other designated components during the interval specified by the Surveillance Frequency, so that all systems, subsystems, channels, or other designated components are tested during $n$ Surveillance Frequency intervals, where $n$ is the total number of systems, subsystems, channels, or other designated components in the associated function.
THERMAL POWER	THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.
TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT)	A TADOT shall consist of operating the trip actuating device and verifying the OPERABILITY of all devices in the channel required for trip actuating device OPERABILITY. The TADOT shall include adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the necessary accuracy. The TADOT may be performed by means of any series of sequential, overlapping, or total channel steps.

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Table 1.1-1 (page 1 of 1)  
MODES

MODE	TITLE	REACTIVITY CONDITION ( $k_{eff}$ )	% RATED THERMAL POWER <sup>(a)</sup>	AVERAGE REACTOR COOLANT TEMPERATURE (°F)
1	Power Operation	$\geq 0.99$	$> 5$	NA
2	Startup	$\geq 0.99$	$\leq 5$	NA
3	Hot Standby	$< 0.99$	NA	$\geq [350]$
4	Hot Shutdown <sup>(b)</sup>	$< 0.99$	NA	$[350] > T_{avg} > [200]$
5	Cold Shutdown <sup>(b)</sup>	$< 0.99$	NA	$\leq [200]$
6	Refueling <sup>(c)</sup>	NA	NA	NA

(a) Excluding decay heat.

(b) All reactor vessel head closure bolts fully tensioned.

(c) One or more reactor vessel head closure bolts less than fully tensioned.

## 1.0 USE AND APPLICATION

### 1.2 Logical Connectors

---

PURPOSE	<p>The purpose of this section is to explain the meaning of logical connectors.</p> <p>Logical connectors are used in Technical Specifications (TS) to discriminate between, and yet connect, discrete Conditions, Required Actions, Completion Times, Surveillances, and Frequencies. The only logical connectors that appear in TS are <u>AND</u> and <u>OR</u>. The physical arrangement of these connectors constitutes logical conventions with specific meanings.</p>
BACKGROUND	<p>Several levels of logic may be used to state Required Actions. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to a Required Action and the placement of the logical connector in the first level of nesting (i.e., left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentations of the logical connectors.</p> <p>When logical connectors are used to state a Condition, Completion Time, Surveillance, or Frequency, only the first level of logic is used, and the logical connector is left justified with the statement of the Condition, Completion Time, Surveillance, or Frequency.</p>
EXAMPLES	<p>The following examples illustrate the use of logical connectors.</p>

---



## 1.2 Logical Connectors

### EXAMPLES (continued)

#### EXAMPLE 1.2-1

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Verify . . .  <u>AND</u>  A.2 Restore . . .	

In this example the logical connector AND is used to indicate that when in Condition A, both Required Actions A.1 and A.2 must be completed.

## 1.2 Logical Connectors

### EXAMPLES (continued)

#### EXAMPLE 1.2-2

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Trip ... <u>OR</u> A.2.1 Verify ... <u>AND</u> A.2.2.1 Reduce ... <u>OR</u> A.2.2.2 Perform ... <u>OR</u> A.3 Align ...	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three Actions may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.

## 1.0 USE AND APPLICATION

### 1.3 Completion Times

PURPOSE	The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.
BACKGROUND	Limiting Conditions for Operation (LCOs) specify minimum requirements for ensuring safe operation of the unit. The ACTIONS associated with an LCO state Conditions that typically describe the ways in which the requirements of the LCO can fail to be met. Specified with each stated Condition are Required Action(s) and Completion Time(s).
DESCRIPTION	<p>The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., inoperable equipment or variable not within limits) that requires entering an ACTIONS Condition unless otherwise specified, providing the unit is in a MODE or specified condition stated in the Applicability of the LCO. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the unit is not within the LCO Applicability.</p> <p>If situations are discovered that require entry into more than one Condition at a time within a single LCO (multiple Conditions), the Required Actions for each Condition must be performed within the associated Completion Time. When in multiple Conditions, separate Completion Times are tracked for each Condition starting from the time of discovery of the situation that required entry into the Condition.</p> <p>Once a Condition has been entered, subsequent trains, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will <u>not</u> result in separate entry into the Condition, unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition.</p> <p>However, when a <u>subsequent</u> train, subsystem, component, or variable expressed in the Condition is discovered to be inoperable or not within limits, the Completion Time(s) may be extended. To apply this Completion Time extension, two criteria must first be met. The subsequent inoperability:</p> <ol style="list-style-type: none"> <li>Must exist concurrent with the <u>first</u> inoperability and</li> </ol>

### 1.3 Completion Times

---

#### DESCRIPTION (continued)

- b. Must remain inoperable or not within limits after the first inoperability is resolved.

The total Completion Time allowed for completing a Required Action to address the subsequent inoperability shall be limited to the more restrictive of either:

- a. The stated Completion Time, as measured from the initial entry into the Condition, plus an additional 24 hours or
- b. The stated Completion Time as measured from discovery of the subsequent inoperability.

The above Completion Time extensions do not apply to those Specifications that have exceptions that allow completely separate re-entry into the Condition (for each train, subsystem, component, or variable expressed in the Condition) and separate tracking of Completion Times based on this re-entry. These exceptions are stated in individual Specifications.

The above Completion Time extension does not apply to a Completion Time with a modified "time zero." This modified "time zero" may be expressed as a repetitive time (i.e., "once per 8 hours," where the Completion Time is referenced from a previous completion of the Required Action versus the time of Condition entry) or as a time modified by the phrase "from discovery . . ." Example 1.3-3 illustrates one use of this type of Completion Time. The 10 day Completion Time specified for Conditions A and B in Example 1.3-3 may not be extended.

---

#### EXAMPLES

The following examples illustrate the use of Completion Times with different types of Conditions and changing Conditions.

### 1.3 Completion Times

#### EXAMPLES (continued)

##### EXAMPLE 1.3-1

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. <u>AND</u>	6 hours
	B.2 Be in MODE 5.	36 hours

Condition B has two Required Actions. Each Required Action has its own separate Completion Time. Each Completion Time is referenced to the time that Condition B is entered.

The Required Actions of Condition B are to be in MODE 3 within 6 hours AND in MODE 5 within 36 hours. A total of 6 hours is allowed for reaching MODE 3 and a total of 36 hours (not 42 hours) is allowed for reaching MODE 5 from the time that Condition B was entered. If MODE 3 is reached within 3 hours, the time allowed for reaching MODE 5 is the next 33 hours because the total time allowed for reaching MODE 5 is 36 hours.

If Condition B is entered while in MODE 3, the time allowed for reaching MODE 5 is the next 36 hours.

### 1.3 Completion Times

#### EXAMPLES (continued)

##### EXAMPLE 1.3-2

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pump inoperable.	A.1 Restore pump to OPERABLE status.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

When a pump is declared inoperable, Condition A is entered. If the pump is not restored to OPERABLE status within 7 days, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the inoperable pump is restored to OPERABLE status after Condition B is entered, Condition A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

When a second pump is declared inoperable while the first pump is still inoperable, Condition A is not re-entered for the second pump. LCO 3.0.3 is entered, since the ACTIONS do not include a Condition for more than one inoperable pump. The Completion Time clock for Condition A does not stop after LCO 3.0.3 is entered, but continues to be tracked from the time Condition A was initially entered.

While in LCO 3.0.3, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has not expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition A.

While in LCO 3.0.3, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has expired, LCO 3.0.3 may be exited and operation continued in accordance with Condition B. The Completion Time for Condition B is tracked from the time the Condition A Completion Time expired.

### 1.3 Completion Times

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#### EXAMPLES (continued)

On restoring one of the pumps to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first pump was declared inoperable. This Completion Time may be extended if the pump restored to OPERABLE status was the first inoperable pump. A 24 hour extension to the stated 7 days is allowed, provided this does not result in the second pump being inoperable for > 7 days.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Function X train inoperable.	A.1 Restore Function X train to OPERABLE status.	7 days  <u>AND</u> 10 days from discovery of failure to meet the LCO
B. One Function Y train inoperable.	B.1 Restore Function Y train to OPERABLE status.	72 hours  <u>AND</u> 10 days from discovery of failure to meet the LCO
C. One Function X train inoperable.  <u>AND</u> One Function Y train inoperable.	C.1 Restore Function X train to OPERABLE status.  <u>OR</u> C.2 Restore Function Y train to OPERABLE status.	72 hours   72 hours

When one Function X train and one Function Y train are inoperable, Condition A and Condition B are concurrently applicable. The Completion Times for Condition A and Condition B are tracked separately for each train starting from the time each train was declared inoperable and the Condition was entered. A separate Completion Time is established for Condition C and tracked from the time the second train was declared inoperable (i.e., the time the situation described in Condition C was discovered).



### 1.3 Completion Times

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#### EXAMPLES (continued)

If Required Action C.2 is completed within the specified Completion Time, Conditions B and C are exited. If the Completion Time for Required Action A.1 has not expired, operation may continue in accordance with Condition A. The remaining Completion Time in Condition A is measured from the time the affected train was declared inoperable (i.e., initial entry into Condition A).

The Completion Times of Conditions A and B are modified by a logical connector with a separate 10 day Completion Time measured from the time it was discovered the LCO was not met. In this example, without the separate Completion Time, it would be possible to alternate between Conditions A, B, and C in such a manner that operation could continue indefinitely without ever restoring systems to meet the LCO. The separate Completion Time modified by the phrase "from discovery of failure to meet the LCO" is designed to prevent indefinite continued operation while not meeting the LCO. This Completion Time allows for an exception to the normal "time zero" for beginning the Completion Time "clock." In this instance, the Completion Time "time zero" is specified as commencing at the time the LCO was initially not met, instead of at the time the associated Condition was entered.

### 1.3 Completion Times

#### EXAMPLES (continued)

##### EXAMPLE 1.3-4

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve(s) to OPERABLE status.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 4.	12 hours

A single Completion Time is used for any number of valves inoperable at the same time. The Completion Time associated with Condition A is based on the initial entry into Condition A and is not tracked on a per valve basis. Declaring subsequent valves inoperable, while Condition A is still in effect, does not trigger the tracking of separate Completion Times.

Once one of the valves has been restored to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first valve was declared inoperable. The Completion Time may be extended if the valve restored to OPERABLE status was the first inoperable valve. The Condition A Completion Time may be extended for up to 4 hours provided this does not result in any subsequent valve being inoperable for > 4 hours.

If the Completion Time of 4 hours (including the extension) expires while one or more valves are still inoperable, Condition B is entered.

## 1.3 Completion Times

## EXAMPLES (continued)

EXAMPLE 1.3-5

## ACTIONS

**- NOTE -**

Separate Condition entry is allowed for each inoperable valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve to OPERABLE status.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 4.	12 hours

The Note above the ACTIONS Table is a method of modifying how the Completion Time is tracked. If this method of modifying how the Completion Time is tracked was applicable only to a specific Condition, the Note would appear in that Condition rather than at the top of the ACTIONS Table.

The Note allows Condition A to be entered separately for each inoperable valve, and Completion Times tracked on a per valve basis. When a valve is declared inoperable, Condition A is entered and its Completion Time starts. If subsequent valves are declared inoperable, Condition A is entered for each valve and separate Completion Times start and are tracked for each valve.

If the Completion Time associated with a valve in Condition A expires, Condition B is entered for that valve. If the Completion Times associated with subsequent valves in Condition A expire, Condition B is entered separately for each valve and separate Completion Times start and are tracked for each valve. If a valve that caused entry into Condition B is restored to OPERABLE status, Condition B is exited for that valve.

### 1.3 Completion Times

---

#### EXAMPLES (continued)

Since the Note in this example allows multiple Condition entry and tracking of separate Completion Times, Completion Time extensions do not apply.

### 1.3 Completion Times

#### EXAMPLES (continued)

##### EXAMPLE 1.3-6

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Perform SR 3.x.x.x.	Once per 8 hours
	<u>OR</u> A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

Entry into Condition A offers a choice between Required Action A.1 or A.2. Required Action A.1 has a "once per" Completion Time, which qualifies for the 25% extension, per SR 3.0.2, to each performance after the initial performance. The initial 8 hour interval of Required Action A.1 begins when Condition A is entered and the initial performance of Required Action A.1 must be complete within the first 8 hour interval. If Required Action A.1 is followed, and the Required Action is not met within the Completion Time (plus the extension allowed by SR 3.0.2), Condition B is entered. If Required Action A.2 is followed and the Completion Time of 8 hours is not met, Condition B is entered.

If after entry into Condition B, Required Action A.1 or A.2 is met, Condition B is exited and operation may then continue in Condition A.

### 1.3 Completion Times

#### EXAMPLES (continued)

##### EXAMPLE 1.3-7

##### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Verify affected subsystem isolated.	1 hour <u>AND</u> Once per 8 hours thereafter
	<u>AND</u> A.2 Restore subsystem to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours

Required Action A.1 has two Completion Times. The 1 hour Completion Time begins at the time the Condition is entered and each "Once per 8 hours thereafter" interval begins upon performance of Required Action A.1.

If after Condition A is entered, Required Action A.1 is not met within either the initial 1 hour or any subsequent 8 hour interval from the previous performance (plus the extension allowed by SR 3.0.2), Condition B is entered. The Completion Time clock for Condition A does not stop after Condition B is entered, but continues from the time Condition A was initially entered. If Required Action A.1 is met after Condition B is entered, Condition B is exited and operation may continue in accordance with Condition A, provided the Completion Time for Required Action A.2 has not expired.

### 1.3 Completion Times

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**IMMEDIATE** When "Immediately" is used as a Completion Time, the Required Action  
**COMPLETION TIME** should be pursued without delay and in a controlled manner.

---

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## 1.0 USE AND APPLICATION

### 1.4 Frequency

---

PURPOSE	The purpose of this section is to define the proper use and application of Frequency requirements.
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DESCRIPTION	Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated LCO. An understanding of the correct application of the specified Frequency is necessary for compliance with the SR.
-------------	---

The "specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0.2, Surveillance Requirement (SR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each SR as well as certain Notes in the Surveillance column that modify performance requirements.

Sometimes special situations dictate when the requirements of a Surveillance are to be met. They are "otherwise stated" conditions allowed by SR 3.0.1. They may be stated as clarifying Notes in the Surveillance, as part of the Surveillances, or both.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be preformed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With an SR satisfied, SR 3.0.4 imposes no restriction.

The use of "met" or "performed" in these instances conveys specific meanings. A Surveillance is "met" only when the acceptance criteria are satisfied. Known failure of the requirements of a Surveillance, even without a Surveillance specifically being "performed," constitutes a Surveillance not "met." "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance criteria.

Some Surveillances contain notes that modify the Frequency of performance or the conditions during which the acceptance criteria must be satisfied. For these Surveillances, the MODE-entry restrictions of SR 3.0.4 may not apply. Such a Surveillance is not required to be performed prior to entering a MODE or other specified condition in the Applicability of the associated LCO if any of the following three conditions are satisfied:



## 1.4 Frequency

---

### DESCRIPTION (continued)

- a. The Surveillance is not required to be met in the MODE or other specified condition to be entered: or
- b. The Surveillance is required to be met in the MODE or other specified condition to be entered, but has been performed within the specified Frequency (i.e., it is current) and is known not to be failed; or
- c. The Surveillance is required to be met, but not performed, in the MODE or other specified condition to be entered, and is known no to be failed.

Examples 1.4-3, 1.4-4, 1.4-5, and 1.4-6 discusses these special situations.

---

### EXAMPLES

The following examples illustrate the various ways that Frequencies are specified. In these examples, the Applicability of the LCO (LCO not shown) is MODES 1, 2, and 3.

## 1.4 Frequency

## EXAMPLES (continued)

EXAMPLE 1.4-1SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Perform CHANNEL CHECK.	12 hours

Example 1.4-1 contains the type of SR most often encountered in the Technical Specifications (TS). The Frequency specifies an interval (12 hours) during which the associated Surveillance must be performed at least one time. Performance of the Surveillance initiates the subsequent interval. Although the Frequency is stated as 12 hours, an extension of the time interval to 1.25 times the stated Frequency is allowed by SR 3.0.2 for operational flexibility. The measurement of this interval continues at all times, even when the SR is not required to be met per SR 3.0.1 (such as when the equipment is inoperable, a variable is outside specified limits, or the unit is outside the Applicability of the LCO). If the interval specified by SR 3.0.2 is exceeded while the unit is in a MODE or other specified condition in the Applicability of the LCO, and the performance of the Surveillance is not otherwise modified (refer to Example 1.4-3), then SR 3.0.3 becomes applicable.

If the interval as specified by SR 3.0.2 is exceeded while the unit is not in a MODE or other specified condition in the Applicability of the LCO for which performance of the SR is required, the Surveillance must be performed within the Frequency requirements of SR 3.0.2 prior to entry into the MODE or other specified condition. Failure to do so would result in a violation of SR 3.0.4.

## 1.4 Frequency

### EXAMPLES (continued)

#### EXAMPLE 1.4-2

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify flow is within limits.	Once within 12 hours after ≥ 25% RTP  <u>AND</u>  24 hours thereafter

Example 1.4-2 has two Frequencies. The first is a one time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicates that both Frequency requirements must be met. Each time reactor power is increased from a power level < 25% RTP to ≥ 25% RTP, the Surveillance must be performed within 12 hours.

The use of "once" indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). This type of Frequency does not qualify for the 25% extension allowed by SR 3.0.2. "Thereafter" indicates future performances must be established per SR 3.0.2, but only after a specified condition is first met (i.e., the "once" performance in this example). If reactor power decreases to < 25% RTP, the measurement of both intervals stops. New intervals start upon reactor power reaching 25% RTP.

## 1.4 Frequency

### EXAMPLES (continued)

#### EXAMPLE 1.4-3

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p style="text-align: center;">-----  <b>- NOTE -</b>                      Not required to be performed until 12 hours after  <math>\geq 25\%</math> RTP.                      -----</p> <p>Perform channel adjustment.</p>	7 days

The interval continues, whether or not the unit operation is  $< 25\%$  RTP between performances.

As the Note modifies the required performance of the Surveillance, it is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is  $< 25\%$  RTP, this Note allows 12 hours after power reaches  $\geq 25\%$  RTP to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency." Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was  $< 25\%$  RTP, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not exceed 12 hours with power  $\geq 25\%$  RTP.

Once the unit reaches  $25\%$  RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

## 1.4 Frequency

## EXAMPLES (continued)

EXAMPLE 1.4-4

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<div>- NOTE - Only required to be met in MODE 1.</div>	
Verify leakage rates are within limits.	24 hours

Example 1.4-4 specifies that the requirements of this Surveillance do not have to be met until the unit is in MODE 1. The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2), but the unit was not in MODE 1, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.4 occurs when changing MODES, even with the 24 hour Frequency exceeded, provided the MODE change was not made into MODE 1. Prior to entering MODE 1 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

## 1.4 Frequency

## EXAMPLES (continued)

EXAMPLE 1.4-5SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<hr/> <b>- NOTE -</b> <hr/>	
Only required to be performed in MODE 1.	
<hr/>	
Perform complete cycle of the valve.	7 days

The interval continues, whether or not the unit operation is in MODE 1,2 or 3 (the assumed Applicability of the associated LCO) between performances.

As the Note modifies the required performance of the Surveillance, the Note is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is not in MODE 1, this Note allows entry into and operation in MODES 2 and 3 to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency" if completed prior to entering MODE 1. Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by SR 3.0.2) interval, but operation was not in MODE 1, it would not constitute a failure of the SR or failure to meet the LCO. Also, no violation of SR 3.0.4 occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not result in entry into MODE 1.

Once the unit reaches MODE 1, the requirement for the Surveillance to be performed within its specified Frequency applies and would require that the Surveillance had been performed. If the Surveillance were not performed prior to entering MODE 1, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of SR 3.0.3 would apply.

## 1.4 Frequency

### EXAMPLES (continued)

#### EXAMPLE 1.4-6

##### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p style="text-align: center;">-----  <b>- NOTE -</b>            Not required to be met in MODE 3.            -----</p> <p>Verify parameter is within limits.</p>	24 hours

Example 1.4-[6] specifies that the requirements of this Surveillance do not have to be met while the unit is in MODE 3 (the assumed Applicability of the associated LCO is MODES 1,2, and 3). The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by SR 3.0.2), and the unit was in MODE 3, there would be no failure of the SR nor failure to meet the LCO. Therefore, no violation of SR 3.0.4 occurs when changing MODES to enter MODE 3, even with the 24 hour Frequency exceeded, provided the MODE change does not result in entry into MODE 2. Prior to entering MODE 2 (assuming again that the 24 hour Frequency were not met), SR 3.0.4 would require satisfying the SR.

## 2.0 SAFETY LIMITS (SLs)

---

### 2.1 SLs

#### 2.1.1 Reactor Core SLs

In MODES 1 and 2, the combination of THERMAL POWER, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in the COLR; and the following SLs shall not be exceeded:

2.1.1.1 The departure from nucleate boiling ratio (DNBR) shall be maintained  $\geq$  [1.17 for the WRB-1/WRB-2 DNB correlations].

2.1.1.2 The peak fuel centerline temperature shall be maintained  $<$  [5080°F, decreasing by 58°F per 10,000 MWD/MTU of burnup].

#### 2.1.2 Reactor Coolant System Pressure SL

In MODES 1, 2, 3, 4, and 5, the RCS pressure shall be maintained  $\leq$  [2735] psig.

---

### 2.2 SAFETY LIMIT VIOLATIONS

2.2.1 If SL 2.1.1 is violated, restore compliance and be in MODE 3 within 1 hour.

2.2.2 If SL 2.1.2 is violated:

2.2.2.1 In MODE 1 or 2, restore compliance and be in MODE 3 within 1 hour.

2.2.2.2 In MODE 3, 4, or 5, restore compliance within 5 minutes.

---



### 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

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LCO 3.0.1	LCOs shall be met during the MODES or other specified conditions in the Applicability, except as provided in LCO 3.0.2 and LCO 3.0.7.
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LCO 3.0.2	Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5 and LCO 3.0.6.
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If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required unless otherwise stated.

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LCO 3.0.3	When an LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit, as applicable, in:
-----------	--

- a. MODE 3 within 7 hours,
- b. MODE 4 within 13 hours, and
- c. MODE 5 within 37 hours.

Exceptions to this Specification are stated in the individual Specifications.

Where corrective measures are completed that permit operation in accordance with the LCO or ACTIONS, completion of the actions required by LCO 3.0.3 is not required.

LCO 3.0.3 is only applicable in MODES 1, 2, 3, and 4.

---

LCO 3.0.4	When an LCO is not met, entry into a MODE or other specified condition in the Applicability shall not be made except when the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time. This Specification shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.
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Exceptions to this Specification are stated in the individual Specifications.

LCO 3.0.4 is only applicable for entry into a MODE or others specified condition in the Applicability in MODES 1, 2, 3, and 4.

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### 3.0 LCO Applicability

#### LCO 3.0.4 (continued)

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**- REVIEWER'S NOTE -**  
-----

LCO 3.0.4 has been revised so that changes in MODES or other specified conditions in the Applicability that are part of a shutdown of the unit shall not be prevented. In addition, LCO 3.0.4 has been revised so that it is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, 3, and 4. The MODE change restrictions in LCO 3.0.4 were previously applicable in all MODES. Before this version of LCO 3.0.4 can be implemented on a plant-specific basis, the licensee must review the existing technical specifications to determine where specific restrictions on MODE changes or Required Actions should be included in individual LCOs to justify this change; such an evaluation should be summarized in a matrix of all existing LCOs to facilitate NRC staff review of a conversion to the STS.

-----

LCO 3.0.5	Equipment removed from service or declared inoperable to comply with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to LCO 3.0.2 for the system returned to service under administrative control to perform the testing required to demonstrate OPERABILITY.
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LCO 3.0.6	When a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, an evaluation shall be performed in accordance with Specification 5.5.15, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.
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When a support system's Required Action directs a supported system to be declared inoperable or directs entry into Conditions and Required Actions for a supported system, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

LCO 3.0.7	Test Exception LCOs [3.1.8 and 3.4.19] allow specified Technical Specification (TS) requirements to be changed to permit performance of special tests and operations. Unless otherwise specified, all other TS requirements remain unchanged. Compliance with Test Exception LCOs
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### 3.0 LCO Applicability

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#### LCO 3.0.7 (continued)

is optional. When a Test Exception LCO is desired to be met but is not met, the ACTIONS of the Test Exception LCO shall be met. When a Test Exception LCO is not desired to be met, entry into a MODE or other specified condition in the Applicability shall be made in accordance with the other applicable Specifications.

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### 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

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SR 3.0.1            SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on inoperable equipment or variables outside specified limits.

---

SR 3.0.2            The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met.

For Frequencies specified as "once," the above interval extension does not apply.

If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this Specification are stated in the individual Specifications.

---

SR 3.0.3            If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is less. This delay period is permitted to allow performance of the Surveillance.

If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

When the Surveillance is performed within the delay period and the Surveillance is not met, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

---

SR 3.0.4            Entry into a MODE or other specified condition in the Applicability of an LCO shall not be made unless the LCO's Surveillances have been met within their specified Frequency. This provision shall not prevent entry into MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

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### 3.0 SR Applicability

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#### SR 3.0.4 (continued)

SR 3.0.4 is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, 3 and 4.

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**- REVIEWER'S NOTE -**

SR 3.0.4 has been revised so that changes in MODES or other specified conditions in the Applicability that are part of a shutdown of the unit shall not be prevented. In addition, SR 3.0.4 has been revised so that it is only applicable for entry into a MODE or other specified condition in the Applicability in MODES 1, 2, 3, and 4. The MODE change restrictions in SR 3.0.4 were previously applicable in all MODES. Before this version of SR 3.0.4 can be implemented on a plant-specific basis, the licensee must review the existing technical specifications to determine where specific restrictions on MODE changes or Required Actions should be included in individual LCOs to justify this change; such an evaluation should be summarized in a matrix of all existing LCOs to facilitate NRC staff review of a conversion to the STS.

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## 3.1 REACTIVITY CONTROL SYSTEMS

## 3.1.1 SHUTDOWN MARGIN (SDM)

LCO 3.1.1 SDM shall be within the limits specified in the COLR.

APPLICABILITY: MODE 2 with  $k_{\text{eff}} < 1.0$ ,  
MODES 3, 4, and 5.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limits.	A.1 Initiate boration to restore SDM to within limits.	15 minutes

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.1.1 Verify SDM to be within limits.	24 hours

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.2 Core Reactivity

LCO 3.1.2            The measured core reactivity shall be within  $\pm 1\% \Delta k/k$  of predicted values.

APPLICABILITY:    MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Measured core reactivity not within limit.	A.1    Re-evaluate core design and safety analysis, and determine that the reactor core is acceptable for continued operation.	7 days
	<u>AND</u> A.2    Establish appropriate operating restrictions and SRs.	7 days
B. Required Action and associated Completion Time not met.	B.1    Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.1.2.1</p> <p style="text-align: center;">----- - NOTE - -----</p> <p>The predicted reactivity values may be adjusted (normalized) to correspond to the measured core reactivity prior to exceeding a fuel burnup of 60 effective full power days (EFPD) after each fuel loading.</p> <p style="text-align: center;">-----</p> <p>Verify measured core reactivity is within <math>\pm 1\% \Delta k/k</math> of predicted values.</p>	<p>Prior to entering MODE 1 after each refueling</p> <p><u>AND</u></p> <p style="text-align: center;">----- - NOTE - -----</p> <p>Only required after 60 EFPD</p> <p style="text-align: center;">-----</p> <p>31 EFPD thereafter</p>



## 3.1 REACTIVITY CONTROL SYSTEMS

## 3.1.3 Moderator Temperature Coefficient (MTC)

LCO 3.1.3 The MTC shall be maintained within the limits specified in the COLR. The maximum upper limit shall be  $[\leq [ ] \Delta k/k^{\circ}F$  at hot zero power] [that specified in Figure 3.1.3-1].

APPLICABILITY: MODE 1 and MODE 2 with  $k_{\text{eff}} \geq 1.0$  for the upper MTC limit, MODES 1, 2, and 3 for the lower MTC limit.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. MTC not within upper limit.	A.1 Establish administrative withdrawal limits for control banks to maintain MTC within limit.	24 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 2 with $k_{\text{eff}} < 1.0$ .	6 hours
C. MTC not within lower limit.	C.1 Be in MODE 4.	12 hours

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.3.1	Verify MTC is within upper limit.	Prior to entering MODE 1 after each refueling

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.1.3.2</p> <p style="text-align: center;">----- - NOTES - -----</p> <ol style="list-style-type: none"> <li>1. Not required to be performed until 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm.</li> <li>2. If the MTC is more negative than the 300 ppm Surveillance limit (not LCO limit) specified in the COLR, SR 3.1.3.2 shall be repeated once per 14 EFPD during the remainder of the fuel cycle.</li> <li>3. SR 3.1.3.2 need not be repeated if the MTC measured at the equivalent of equilibrium RTP-ARO boron concentration of <math>\leq 60</math> ppm is less negative than the 60 ppm Surveillance limit specified in the COLR.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify MTC is within lower limit.</p>	<p>Once each cycle</p>

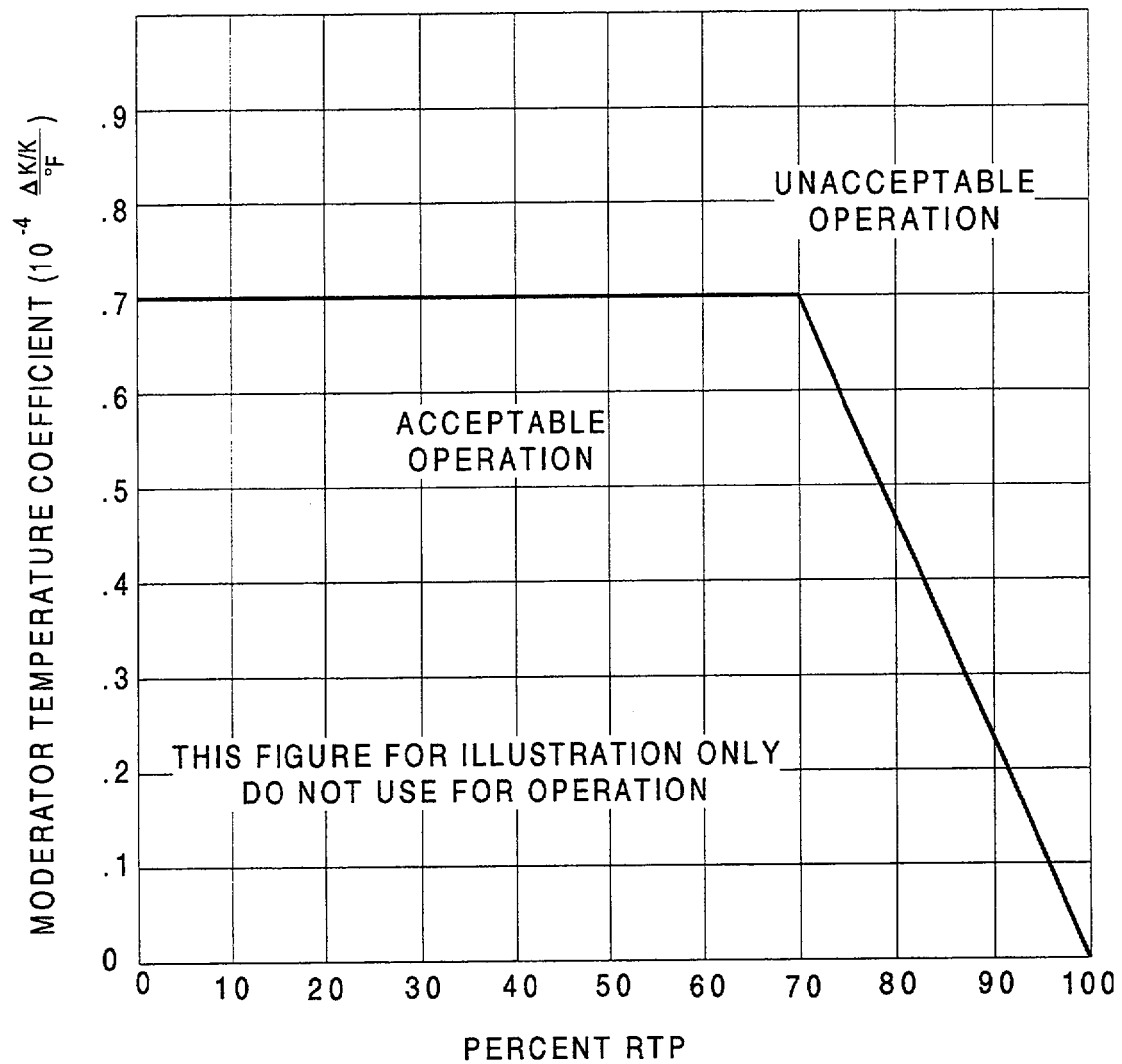


Figure 3.1.3 - 1 (page 1 of 1)  
Moderator Temperature Coefficient Vs. Rated Thermal Power

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.4 Rod Group Alignment Limits

LCO 3.1.4 All shutdown and control rods shall be OPERABLE.

AND

Individual indicated rod positions shall be within 12 steps of their group step counter demand position.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more rod(s) inoperable.	A.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Be in MODE 3	6 hours
B. One rod not within alignment limits.	B.1 Restore rod to within alignment limits.	1 hour
	<u>OR</u>	
	B.2.1.1 Verify SDM to be within the limits specified in the COLR.	1 hour
	<u>OR</u>	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.2.1.2 Initiate boration to restore SDM to within limit.  <u>AND</u>	1 hour
	B.2.2 Reduce THERMAL POWER to $\leq$ 75% RTP.  <u>AND</u>	2 hours
	B.2.3 Verify SDM is within the limits specified in the COLR.  <u>AND</u>	Once per 12 hours
	B.2.4 Perform SR 3.2.1.1. and SR 3.2.1.2.  <u>AND</u>	72 hours
	B.2.5 Perform SR 3.2.2.1.  <u>AND</u>	72 hours
	B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours
D. More than one rod not within alignment limit.	D.1.1 Verify SDM is within the limits specified in the COLR.  <u>OR</u>	1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	D.1.2 Initiate boration to restore required SDM to within limit.	1 hour
	<u>AND</u>	
	D.2 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	Verify individual rod positions within alignment limit.	12 hours
SR 3.1.4.2	Verify rod freedom of movement (trippability) by moving each rod not fully inserted in the core $\geq 10$ steps in either direction.	92 days
SR 3.1.4.3	<p>Verify rod drop time of each rod, from the fully withdrawn position, is <math>\leq [2.2]</math> seconds from the beginning of decay of stationary gripper coil voltage to dashpot entry, with:</p> <p>a. <math>T_{avg} \geq 500^{\circ}\text{F}</math> and</p> <p>b. All reactor coolant pumps operating.</p>	Prior to criticality after each removal of the reactor head

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.5 Shutdown Bank Insertion Limits

LCO 3.1.5 Each shutdown bank shall be within insertion limits specified in the COLR.

APPLICABILITY: MODES 1 and 2.

**- NOTE -**

This LCO is not applicable while performing SR 3.1.4.2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown banks not within limits.	A.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Restore shutdown banks to within limits.	2 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify each shutdown bank is within the insertion limits specified in the COLR.	12 hours



### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.6 Control Bank Insertion Limits

LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

APPLICABILITY: MODE 1,  
MODE 2 with  $k_{eff} \geq 1.0$ .

**- NOTE -**

This LCO is not applicable while performing SR 3.1.4.2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control bank insertion limits not met.	A.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	A.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	A.2 Restore control bank(s) to within limits.	2 hours
B. Control bank sequence or overlap limits not met.	B.1.1 Verify SDM is within the limits specified in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.2 Restore control bank sequence and overlap to within limits.	2 hours
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 2 with $k_{eff} < 1.0$ .	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.6.1 Verify estimated critical control bank position is within the limits specified in the COLR.	Within 4 hours prior to achieving criticality
SR 3.1.6.2 Verify each control bank insertion is within the insertion limits specified in the COLR.	12 hours
SR 3.1.6.3 Verify sequence and overlap limits specified in the COLR are met for control banks not fully withdrawn from the core.	12 hours

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.7 Rod Position Indication

LCO 3.1.7 The [Digital] Rod Position Indication ([D]RPI) System and the Demand Position Indication System shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

**- NOTE -**

Separate Condition entry is allowed for each inoperable rod position indicator and each demand position indicator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One [D]RPI per group inoperable for one or more groups.	A.1 Verify the position of the rods with inoperable position indicators indirectly by using movable incore detectors.	Once per 8 hours
	<u>OR</u> A.2 Reduce THERMAL POWER to $\leq 50\%$ RTP.	8 hours
B. More than one [D]RPI per group inoperable.	B.1 Place the control rods under manual control.	Immediately
	<u>AND</u> B.2 Monitor and Record RCS $T_{avg}$ <u>AND</u>	Once per 1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	<p>B.3 Verify the position of the rods with inoperable position indicators indirectly by using the movable incore detectors.</p> <p><u>AND</u></p> <p>B.4 Restore inoperable position indicators to OPERABLE status such that a maximum of one [D]RPI per group is inoperable.</p>	<p>Once per 8 hours</p> <p>24 hours</p>
C. One or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position.	<p>C.1 Verify the position of the rods with inoperable position indicators indirectly by using movable incore detectors.</p> <p><u>OR</u></p> <p>C.2 Reduce THERMAL POWER to <math>\leq</math> 50% RTP.</p>	<p>[4] hours</p> <p>8 hours</p>
D. One demand position indicator per bank inoperable for one or more banks.	<p>D.1.1 Verify by administrative means all [D]RPIs for the affected banks are OPERABLE.</p> <p><u>AND</u></p> <p>D.1.2 Verify the most withdrawn rod and the least withdrawn rod of the affected banks are <math>\leq</math> 12 steps apart.</p> <p><u>OR</u></p>	<p>Once per 8 hours</p> <p>Once per 8 hours</p>

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	D.2 Reduce THERMAL POWER to $\leq$ 50% RTP.	8 hours
E. Required Action and associated Completion Time not met.	E.1 Be in MODE 3.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify each [D]RPI agrees within [12] steps of the group demand position for the [full indicated range] of rod travel.	Once prior to criticality after each removal of the reactor head

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.8 PHYSICS TESTS Exceptions - MODE 2

LCO 3.1.8 During the performance of PHYSICS TESTS, the requirements of:

LCO 3.1.3, "Moderator Temperature Coefficient,"  
LCO 3.1.4, "Rod Group Alignment Limits,"  
LCO 3.1.5, "Shutdown Bank Insertion Limits,"  
LCO 3.1.6, "Control Bank Insertion Limits," and  
LCO 3.4.2, "RCS Minimum Temperature for Criticality"

may be suspended and the number of required channels for LCO 3.3.1, "RTS Instrumentation," Functions 2,3,6 and 18.e, may be reduced to 3, provided that:

- a. RCS lowest loop average temperature is  $\geq [531]^{\circ}\text{F}$ ,
- b. SDM is within the limits specified in the COLR, and
- c. THERMAL POWER is  $< 5\%$  RTP.

APPLICABILITY: During PHYSICS TESTS initiated in MODE 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes
	<u>AND</u> A.2 Suspend PHYSICS TESTS exceptions.	1 hour
B. THERMAL POWER not within limit.	B.1 Open reactor trip breakers.	Immediately
C. RCS lowest loop average temperature not within limit.	C.1 Restore RCS lowest loop average temperature to within limit.	15 minutes

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	Perform a CHANNEL OPERATIONAL TEST on power range and intermediate range channels per [SR 3.3.1.7, SR 3.3.1.8, and Table 3.3.1-1].	Prior to initiation of PHYSICS TESTS
SR 3.1.8.2	Verify the RCS lowest loop average temperature is $\geq$ [531]°F.	30 minutes
SR 3.1.8.3	Verify THERMAL POWER is < 5% RTP.	30 minutes
SR 3.1.8.4	Verify SDM is within the limits specified in the COLR.	24 hours

## 3.2 POWER DISTRIBUTION LIMITS

### 3.2.1A Heat Flux Hot Channel Factor ( $F_Q(Z)$ ) ( CAOC- $F_{xy}$ Methodology)

LCO 3.2.1A  $F_Q(Z)$  shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p><b>- NOTE -</b> Required Action A.4 shall be completed whenever this Condition is entered.</p> <p>A. <math>F_Q(Z)</math> not within limit.</p>	<p>A.1 Reduce THERMAL POWER <math>\geq 1\%</math> RTP for each 1% <math>F_Q(Z)</math> exceeds limit.</p> <p><u>AND</u></p> <p>A.2 Reduce Power Range Neutron Flux - High trip setpoints <math>\geq 1\%</math> for each 1% <math>F_Q(Z)</math> exceeds limit.</p> <p><u>AND</u></p> <p>A.3 Reduce Overpower <math>\Delta T</math> trip setpoints <math>\geq 1\%</math> for each 1% <math>F_Q(Z)</math> exceeds limit.</p> <p><u>AND</u></p> <p>A.4 Perform SR 3.2.1.1 and SR 3.2.1.2.</p>	<p>15 minutes after each <math>F_Q(Z)</math> determination</p> <p>72 hours after each <math>F_Q(Z)</math> determination</p> <p>72 hours after each <math>F_Q(Z)</math> determination</p> <p>Prior to increasing THERMAL POWER above the limit of Required Action A.1</p>
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 2.	6 hours



## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify measured values of $F_Q(Z)$ are within limits specified in the COLR.	Once after each refueling prior to THERMAL POWER exceeding 75% RTP  <u>AND</u>  31 EFPD thereafter
SR 3.2.1.2	<p style="text-align: center;">----- - NOTES - -----</p> <ol style="list-style-type: none"> <li>1. If <math>F_{xy}^C &gt; F_{xy}^L</math>, evaluate the effect of <math>F_{xy}</math> on the predicted <math>F_Q^{PR}</math> to determine if <math>F_Q(Z)</math> is within its limits.</li> <li>2. If <math>F_{xy}^{RTP} &lt; F_{xy}^C \leq F_{xy}^L</math>, SR 3.2.1.2 shall be repeated within 24 hours after an increase in THERMAL POWER at which <math>F_{xy}^C</math> was last determined, of at least 20% RTP.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify <math>F_{xy}^C &lt; F_{xy}^L</math>.</p>	Once after each refueling prior to THERMAL POWER exceeding 75% RTP  <u>AND</u>  31 EFPD thereafter

### 3.2 POWER DISTRIBUTION LIMITS

#### 3.2.1B Heat Flux Hot Channel Factor ( $F_o(Z)$ ) (RAOC-W(Z) Methodology)

LCO 3.2.1B  $F_o(Z)$ , as approximated by  $F_o^C(Z)$  and  $F_o^W(Z)$ , shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>-----  <b>- NOTE -</b>                      Required Action A.4 shall be completed whenever this Condition is entered.                      -----</p> <p>A. <math>F_o^C(Z)</math> not within limit.</p>	A.1 Reduce THERMAL POWER $\geq 1\%$ RTP for each 1% $F_o^C(Z)$ exceeds limit.	15 minutes after each $F_o^C(Z)$ determination
	<u>AND</u>	
	A.2 Reduce Power Range Neutron Flux - High trip setpoints $\geq 1\%$ for each 1% $F_o^C(Z)$ exceeds limit.	72 hours after each $F_o^C(Z)$ determination
	<u>AND</u>	
	A.3 Reduce Overpower $\Delta T$ trip setpoints $\geq 1\%$ for each 1% $F_o^C(Z)$ exceeds limit.	72 hours after each $F_o^C(Z)$ determination
	<u>AND</u>	
	A.4 Perform SR 3.2.1.1 and SR 3.2.1.2.	Prior to increasing THERMAL POWER above the limit of Required Action A

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>-----</p> <p><b>- NOTE -</b></p> <p>Required Action B.4 shall be completed whenever this Condition is entered.</p> <p>-----</p>	<p>B.1      Reduce AFD limits <math>\geq 1\%</math> for each 1% <math>F_Q^W(Z)</math> exceeds limit.</p> <p><u>AND</u></p>	4 hours
B. $F_Q^W(Z)$ not within limits.	<p>B.2      Reduce Power Range Neutron Flux - High trip setpoints <math>\geq 1\%</math> for each 1% that the maximum allowable power of the AFD limits is reduced.</p> <p><u>AND</u></p>	72 hours
	<p>B.3      Reduce Overpower <math>\Delta T</math> trip setpoints <math>\geq 1\%</math> for each 1% that the maximum allowable power of the AFD limits is reduced.</p> <p><u>AND</u></p>	72 hours
	<p>B.4      Perform SR 3.2.1.1 and SR 3.2.1.2.</p>	Prior to increasing THERMAL POWER above the maximum allowable power of the AFD limits
C. Required Action and associated Completion Time not met.	C.1      Be in MODE 2.	6 hours

## SURVEILLANCE REQUIREMENTS

### - NOTE -

During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution map is obtained.

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify $F_Q^C(Z)$ is within limit.	<p>Once after each refueling prior to THERMAL POWER exceeding 75% RTP</p> <p><u>AND</u></p> <p>Once within [12] hours after achieving equilibrium conditions after exceeding, by <math>\geq 10\%</math> RTP, the THERMAL POWER at which <math>F_Q^C(Z)</math> was last verified</p> <p><u>AND</u></p> <p>31 EFPD thereafter</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>If F<sub>o</sub><sup>w</sup>(Z) measurements indicate</p> <p style="padding-left: 40px;">maximum over z [ F<sub>o</sub><sup>c</sup>(Z) / K(Z) ]</p> <p>has increased since the previous evaluation of F<sub>o</sub><sup>c</sup>(Z):</p> <p>a. Increase F<sub>o</sub><sup>w</sup>(Z) by the appropriate factor and reverify F<sub>o</sub><sup>w</sup>(Z) is within limits or</p> <p>b. Repeat SR 3.2.1.2 once per 7 EFPD until two successive flux maps indicate</p> <p style="padding-left: 40px;">maximum over z [ F<sub>o</sub><sup>c</sup>(Z) / K(Z) ]</p> <p style="padding-left: 40px;">has not increased.</p> <p>-----</p> <p>Verify F<sub>o</sub><sup>w</sup>(Z) is within limit.</p>	<p>Once after each refueling prior to THERMAL POWER exceeding 75% RTP</p> <p><u>AND</u></p> <p>Once within [12] hours after achieving equilibrium conditions after exceeding, by ≥ 10% RTP, the THERMAL POWER at which F<sub>o</sub><sup>w</sup>(Z) was last verified</p> <p><u>AND</u></p> <p>31 EFPD thereafter</p>

## 3.2 POWER DISTRIBUTION LIMITS

### 3.2.1C Heat Flux Hot Channel Factor ( $F_Q(Z)$ (CAOC-W(Z) Methodology)

LCO 3.2.1C  $F_Q(Z)$ , as approximated by  $F_Q^C(Z)$  and  $F_Q^W(Z)$ , shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>-----  <b>- NOTE -</b>                      Required Action A.4 shall be completed whenever this Condition is entered.                      -----</p> <p>A. <math>F_Q^C(Z)</math> not within limit.</p>	<p>A.1 Reduce THERMAL POWER <math>\geq 1\%</math> RTP for each <math>1\% F_Q^C(Z)</math> exceeds limit.</p> <p><u>AND</u></p> <p>A.2 Reduce Power Range Neutron Flux - High trip setpoints <math>\geq 1\%</math> for each <math>1\% F_Q^C(Z)</math> exceeds limit.</p> <p><u>AND</u></p> <p>A.3 Reduce Overpower <math>\Delta T</math> trip setpoints <math>\geq 1\%</math> for each <math>1\% F_Q^C(Z)</math> exceeds limit.</p> <p><u>AND</u></p> <p>A.4 Perform SR 3.2.1.1 and SR 3.2.1.2.</p>	<p>15 minutes after each <math>F_Q^C(Z)</math> determination</p> <p>72 hours after each <math>F_Q^C(Z)</math> determination</p> <p>72 hours after each <math>F_Q^C(Z)</math> determination</p> <p>Prior to increasing THERMAL POWER above the limit of Required Action A</p>

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>-----  <b>- NOTE -</b>                      Required Action B.4 shall be completed whenever this Condition is entered.                      -----</p>	<p>B.1      Reduce AFD limits <math>\geq 1\%</math> for each 1% F<sub>Q</sub><sup>W</sup>(Z) exceeds limit.</p> <p><u>AND</u></p>	4 hours
B. F <sub>Q</sub> <sup>W</sup> (Z) not within limits.	<p>B.2      Reduce Power Range Neutron Flux - High trip setpoints <math>\geq 1\%</math> for each 1% that the maximum allowable power of the AFD limits is reduced.</p> <p><u>AND</u></p>	72 hours
	<p>B.3      Reduce Overpower <math>\Delta T</math> trip setpoints <math>\geq 1\%</math> for each 1% that the maximum allowable power of the AFD limits is reduced.</p> <p><u>AND</u></p>	72 hours
	<p>B.4      Perform SR 3.2.1.1 and SR 3.2.1.2.</p>	Prior to increasing THERMAL POWER above the limit of Required Action B.1
C. Required Action and associated Completion Time not met.	C.1      Be in MODE 2.	6 hours

## SURVEILLANCE REQUIREMENTS

- NOTE -

During power escalation at the beginning of each cycle, THERMAL POWER may be increased until an equilibrium power level has been achieved, at which a power distribution map is obtained.

SURVEILLANCE		FREQUENCY
SR 3.2.1.1	Verify $F_Q^C(Z)$ is within limit.	<p>Once after each refueling prior to THERMAL POWER exceeding 75% RTP</p> <p><u>AND</u></p> <p>Once within [12] hours after achieving equilibrium conditions after exceeding, by <math>\geq 10\%</math> RTP, the THERMAL POWER at which <math>F_Q^C(Z)</math> was last verified</p> <p><u>AND</u></p> <p>31 EFPD thereafter</p>



SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.2.1.2 -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>If measurements indicate that the maximum over <math>z</math> [ <math>F_Q^C(Z) / K(Z)</math> ] has increased since the previous evaluation of <math>F_Q^C(Z)</math> either:</p> <ul style="list-style-type: none"> <li>a. Increase <math>F_Q^W(Z)</math> by the greater of a factor of [1.02] or by an appropriate factor specified in the COLR and reverify <math>F_Q^W(Z)</math> is within limits or</li> <li>b. Repeat SR 3.2.1.2 once per 7 EFPD until either               <ul style="list-style-type: none"> <li>a. above is met or two successive flux maps indicate that the maximum over <math>z</math> [ <math>F_Q^C(Z) / K(Z)</math> ] has not increased.</li> </ul> </li> </ul> <p>-----</p> <p>Verify <math>F_Q^W(Z)</math> is within limit.</p>	<p>Once after each refueling prior to THERMAL POWER exceeding 75% RTP</p> <p><u>AND</u></p> <p>Once within [12] hours after achieving equilibrium conditions after exceeding, by <math>\geq 10\%</math> RTP, the THERMAL POWER at which <math>F_Q^W(Z)</math> was last verified</p> <p><u>AND</u></p> <p>31 EFPD thereafter</p>

## 3.2 POWER DISTRIBUTION LIMITS

### 3.2.2 Nuclear Enthalpy Rise Hot Channel Factor ( $F_{\Delta H}^N$ )

LCO 3.2.2  $F_{\Delta H}^N$  shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----- <b>- NOTE -</b> Required Actions A.2 and A.3 must be completed whenever Condition A is entered. ----- $F_{\Delta H}^N$ not within limit.	A.1.1 Restore $F_{\Delta H}^N$ to within limit.	4 hours
	<u>OR</u>	
	A.1.2.1 Reduce THERMAL POWER to < 50% RTP.	4 hours
	<u>AND</u>	
	A.1.2.2 Reduce Power Range Neutron Flux - High trip setpoints to $\leq$ 55% RTP.	72 hours
	<u>AND</u>	
	A.2 Perform SR 3.2.2.1.	24 hours
	<u>AND</u>	

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	A.3 ----- <b>- NOTE -</b> THERMAL POWER does not have to be reduced to comply with this Required Action. ----- Perform SR 3.2.2.1.	Prior to THERMAL POWER exceeding 50% RTP  <u>AND</u>  Prior to THERMAL POWER exceeding 75% RTP  <u>AND</u>  24 hours after THERMAL POWER reaching $\geq$ 95% RTP
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 2.	6 hours

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.2.1	Verify $F_{\Delta H}^N$ is within limits specified in the COLR.	Once after each refueling prior to THERMAL POWER exceeding 75% RTP  <u>AND</u>  31 EFPD thereafter

## 3.2 POWER DISTRIBUTION LIMITS

### 3.2.3A AXIAL FLUX DIFFERENCE (AFD) (Constant Axial Offset Control (CAOC) Methodology)

LCO 3.2.3

The AFD:

- a. Shall be maintained within the target band about the target flux difference. The target band is specified in the COLR.
- b. May deviate outside the target band with THERMAL POWER < 90% RTP but  $\geq$  50% RTP, provided AFD is within the acceptable operation limits and cumulative penalty deviation time is  $\leq$  1 hour during the previous 24 hours. The acceptable operation limits are specified in the COLR.
- c. May deviate outside the target band with THERMAL POWER < 50% RTP.

---

**- NOTES -**

1. The AFD shall be considered outside the target band when two or more OPERABLE excore channels indicate AFD to be outside the target band.
  2. With THERMAL POWER  $\geq$  50% RTP, penalty deviation time shall be accumulated on the basis of a 1 minute penalty deviation for each 1 minute of power operation with AFD outside the target band.
  3. With THERMAL POWER < 50% RTP and > 15 % RTP, penalty deviation time shall be accumulated on the basis of a 0.5 minute penalty deviation for each 1 minute of power operation with AFD outside the target band.
  4. A total of 16 hours of operation may be accumulated with AFD outside the target band without penalty deviation time during surveillance of power range channels in accordance with SR 3.3.1.6, provided AFD is maintained within acceptable operation limits.
- 

APPLICABILITY: MODE 1 with THERMAL POWER > 15% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. THERMAL POWER <math>\geq 90\%</math> RTP.</p> <p><u>AND</u></p> <p>AFD not within the target band.</p>	<p>A.1 Restore AFD to within target band.</p>	<p>15 minutes</p>
<p>B. Required Action and associated Completion Time of Condition A not met.</p>	<p>B.1 Reduce THERMAL POWER to <math>&lt; 90\%</math> RTP.</p>	<p>15 minutes</p>
<p>C. -----</p> <p><b>- NOTE -</b></p> <p>Required Action C.1 must be completed whenever Condition C is entered.</p> <p>-----</p> <p>THERMAL POWER <math>&lt; 90\%</math> and <math>\geq 50\%</math> RTP with cumulative penalty deviation time <math>&gt; 1</math> hour during the previous 24 hours.</p> <p><u>OR</u></p> <p>THERMAL POWER <math>&lt; 90\%</math> and <math>\geq 50\%</math> RTP with AFD not within the acceptable operation limits.</p>	<p>C.1 Reduce THERMAL POWER to <math>&lt; 50\%</math> RTP.</p>	<p>30 minutes</p>
<p>D. Required Action and associated Completion Time for Condition C not met.</p>	<p>D.1 Reduce THERMAL POWER to <math>&lt; 15\%</math> RTP.</p>	<p>9 hours</p>

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.3.1	Verify AFD is within limits for each OPERABLE excore channel.	7 days
SR 3.2.3.2	<p>Update target flux difference of each OPERABLE excore channel by:</p> <ul style="list-style-type: none"> <li>a. Determining the target flux difference in accordance with SR 3.2.3.3, or</li> <li>b. Using linear interpolation between the most recently measured value, and either the predicted value for the end of cycle or 0% AFD.</li> </ul>	<p>Once within 31 EFPD after each refueling</p> <p><u>AND</u></p> <p>31 EFPD thereafter</p>
SR 3.2.3.3	<p>-----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>The initial target flux difference after each refueling may be determined from design predictions.</p> <p>-----</p> <p>Determine, by measurement, the target flux difference.</p>	<p>Once within 31 EFPD after each refueling</p> <p><u>AND</u></p> <p>92 EFPD thereafter</p>

### 3.2 POWER DISTRIBUTION LIMITS

#### 3.2.3B AXIAL FLUX DIFFERENCE (AFD) (Relaxed Axial Offset Control (RAOC) Methodology)

LCO 3.2.3 The AFD in % flux difference units shall be maintained within the limits specified in the COLR.

-----  
**- NOTE -**  
-----

The AFD shall be considered outside limits when two or more  
OPERABLE excore channels indicate AFD to be outside limits.  
-----

APPLICABILITY: MODE 1 with THERMAL POWER  $\geq$  50% RTP.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. AFD not within limits.	A.1 Reduce THERMAL POWER to < 50% RTP.	30 minutes

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.3.1	Verify AFD within limits for each OPERABLE excore channel.	7 days



## 3.2 POWER DISTRIBUTION LIMITS

### 3.2.4 QUADRANT POWER TILT RATIO (QPTR)

LCO 3.2.4 The QPTR shall be  $\leq 1.02$ .

APPLICABILITY: MODE 1 with THERMAL POWER > 50% RTP.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. QPTR not within limit.	A.1 Reduce THERMAL POWER $\geq 3\%$ from RTP for each 1% of QPTR > 1.00.	2 hours after each QPTR determination
	<u>AND</u>	
	A.2 Perform SR 3.2.4.1.	Once per 12 hours
	<u>AND</u>	
	A.3 Perform SR 3.2.1.1 and SR 3.2.2.1.	24 hours after achieving equilibrium conditions from a THERMAL POWER reduction per Required Action A.1
		<u>AND</u>
		Once per 7 days thereafter
	<u>AND</u>	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	A.4 Reevaluate safety analyses and confirm results remain valid for duration of operation under this condition.	Prior to increasing THERMAL POWER above the limit of Required Action A.1
	<u>AND</u>	
	A.5 ----- - NOTE - 1. Perform Required Action A.5 only after Required Action A.4 is completed. 2. Required Action A.6 shall be completed whenever Required Action A.5 is performed. -----	
	Normalize excore detectors to restore QPTR to within limit.	Prior to increasing THERMAL POWER above the limit of Required Action A.1
	<u>AND</u>	
	A.6 ----- - NOTES - Perform Required Action A.6 only after Required Action A.5 is completed. -----	
	Perform SR 3.2.1.1, SR 3.2.1.2, and SR 3.2.2.1.	Within 24 hours after achieving equilibrium conditions at RTP not to exceed 48 hours after increasing THERMAL POWER above the limit of Required Action A.1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Reduce THERMAL POWER to $\leq$ 50% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.2.4.1</p> <p style="text-align: center;">----- - NOTES - -----</p> <ol style="list-style-type: none"> <li>With input from one Power Range Neutron Flux channel inoperable and THERMAL POWER <math>\leq</math> 75% RTP, the remaining three power range channels can be used for calculating QPTR.</li> <li>SR 3.2.4.2 may be performed in lieu of this Surveillance.</li> </ol> <p style="text-align: center;">-----</p> <p>Verify QPTR is within limit by calculation.</p>	7 days
<p>SR 3.2.4.2</p> <p style="text-align: center;">----- - NOTE - -----</p> <p>Not required to be performed until 12 hours after input from one or more Power Range Neutron Flux channels are inoperable with THERMAL POWER <math>&gt;</math> 75% RTP.</p> <p style="text-align: center;">-----</p> <p>Verify QPTR is within limit using the movable incore detectors.</p>	12 hours

### 3.3 INSTRUMENTATION

#### 3.3.1 Reactor Trip System (RTS) Instrumentation

LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

#### ACTIONS

**- NOTE -**

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.1-1 for the channel(s) or train(s).	Immediately
B. One Manual Reactor Trip channel inoperable.	B.1 Restore channel to OPERABLE status.	48 hours
	<u>OR</u> B.2. Be in MODE 3.	54 hours
C. One channel or train inoperable.	C.1 Restore channel or train to OPERABLE status.	48 hours
	<u>OR</u> C.2.1 Initiate action to fully insert all rods.  <u>AND</u>	48 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
D. One Power Range Neutron Flux - High channel inoperable.	<p>-----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>The inoperable channel may be bypassed for up to 4 hours for surveillance testing and setpoint adjustment of other channels.</p> <p>-----</p>	
	D.1.1 Place channel in trip.	6 hours
	<u>AND</u>	
	D.1.2 Reduce THERMAL POWER to $\leq$ 75% RTP.	12 hours
	<u>OR</u>	
	D.2.1 Place channel in trip.	6 hours
	<u>AND</u>	
	D.2.2 <p>-----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable.</p> <p>-----</p> <p>Perform SR 3.2.4.2.</p>	Once per 12 hours
	<u>OR</u>	
	D.3 Be in MODE 3.	12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	<p>-----  <b>- NOTE -</b>  The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.  -----</p>	
	E.1 Place channel in trip.	6 hours
	<u>OR</u>	
	E.2 Be in MODE 3.	12 hours
F. One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	24 hours
	<u>OR</u>	
	F.2 Increase THERMAL POWER to > P -10.	24 hours
G. Two Intermediate Range Neutron Flux channels inoperable.	<p>-----  <b>- NOTE -</b>  Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM.  -----</p>	
	G.1 Suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u>	
	G.2 Reduce THERMAL POWER to < P-6.	2 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. One Source Range Neutron Flux channel inoperable.	<p>-----  <b>- NOTE -</b>            Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM.            -----</p>	Immediately
	H.1 Suspend operations involving positive reactivity additions.	
I. Two Source Range Neutron Flux channels inoperable.	I.1 Open Reactor Trip Breakers (RTBs).	Immediately
J. One Source Range Neutron Flux channel inoperable.	J.1 Restore channel to OPERABLE status.	48 hours
	<u>OR</u>	
	J.2.1 Initiate action to fully insert all rods.	48 hours
	<u>AND</u>	
	J.2.2 Place the Rod Control System in a condition incapable of rod withdrawal.	49 hours
K. One channel inoperable.	<p>-----  <b>- NOTE -</b>            The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.            -----</p>	6 hours
	K.1 Place channel in trip.	
	<u>OR</u>	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	K.2 Reduce THERMAL POWER to < P-7.	12 hours
L. One Reactor Coolant Pump Breaker Position channel inoperable.	<div style="text-align: center;"> <p>-----</p> <p><b>- NOTE -</b></p> <p>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</p> <p>-----</p> </div>	
	L.1 Restore channel to OPERABLE status.	6 hours
	<p><u>OR</u></p>	
	L.2 Reduce THERMAL POWER to < P-8.	10 hours
M. One Turbine Trip channel inoperable.	<div style="text-align: center;"> <p>-----</p> <p><b>- NOTE -</b></p> <p>The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</p> <p>-----</p> </div>	
	M.1 Place channel in trip.	6 hours
	<p><u>OR</u></p>	
	M.2 Reduce THERMAL POWER to < [P-9].	10 hours



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
N. One train inoperable.	<p>-----</p> <p><b>- NOTE -</b> One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE.</p> <p>-----</p>	
	N.1 Restore train to OPERABLE status.	6 hours
	<u>OR</u>	
	N.2 Be in MODE 3.	12 hours
O. One RTB train inoperable.	<p>-----</p> <p><b>- NOTE -</b> 1. One train may be bypassed for up to 2 hours for surveillance testing, provided the other train is OPERABLE.  2. One RTB may be bypassed for up to 2 hours for maintenance on undervoltage or shunt trip mechanisms, provided the other train is OPERABLE.</p> <p>-----</p>	
	O.1 Restore train to OPERABLE status.	1 hour
	<u>OR</u>	
	O.2 Be in MODE 3.	7 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
P. One or more channels inoperable.	P.1 Verify interlock is in required state for existing unit conditions.	1 hour
	<u>OR</u>	
	P.2 Be in MODE 3.	7 hours
Q. One or more channels inoperable.	Q.1 Verify interlock is in required state for existing unit conditions.	1 hour
	<u>OR</u>	
	Q.2 Be in MODE 2.	7 hours
R. One trip mechanism inoperable for one RTB.	R.1 Restore inoperable trip mechanism to OPERABLE status.	48 hours
	<u>OR</u>	
	R.2 Be in MODE 3.	54 hours

SURVEILLANCE REQUIREMENTS

- NOTE -

Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Perform CHANNEL CHECK.	12 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.2</p> <p style="text-align: center;">----- - NOTES - -----</p> <ol style="list-style-type: none"> <li>Adjust NIS channel if absolute difference is &gt; 2%.</li> <li>Not required to be performed until [12] hours after THERMAL POWER is <math>\geq</math> 15% RTP.</li> </ol> <p style="text-align: center;">-----</p> <p>Compare results of calorimetric heat balance calculation to Nuclear Instrumentation System (NIS) channel output.</p>	<p>24 hours</p>
<p>SR 3.3.1.3</p> <p style="text-align: center;">----- - NOTES - -----</p> <ol style="list-style-type: none"> <li>Adjust NIS channel if absolute difference is <math>\geq</math> 3%.</li> <li>Not required to be performed until [24] hours after THERMAL POWER is <math>\geq</math> [15]% RTP.</li> </ol> <p style="text-align: center;">-----</p> <p>Compare results of the incore detector measurements to NIS AFD.</p>	<p>31 effective full power days (EFPD)</p>
<p>SR 3.3.1.4</p> <p style="text-align: center;">----- - NOTE - -----</p> <p>This Surveillance must be performed on the reactor trip bypass breaker prior to placing the bypass breaker in service.</p> <p style="text-align: center;">-----</p> <p>Perform TADOT.</p>	<p>31 days on a STAGGERED TEST BASIS</p>
<p>SR 3.3.1.5</p> <p>Perform ACTUATION LOGIC TEST.</p>	<p>31 days on a STAGGERED TEST BASIS</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.6</p> <p>-----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Not required to be performed until [24] hours after THERMAL POWER is <math>\geq</math> 50% RTP.</p> <p>-----</p> <p>Calibrate excore channels to agree with incore detector measurements.</p>	<p>[92] EFPD</p>
<p>SR 3.3.1.7</p> <p>-----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Not required to be performed for source range instrumentation prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3.</p> <p>-----</p> <p>Perform COT.</p>	<p>[92] days</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.8</p> <hr/> <p style="text-align: center;"><b>- NOTE -</b></p> <p>This Surveillance shall include verification that interlocks P-6 and P-10 are in their required state for existing unit conditions.</p> <hr/> <p>Perform COT.</p>	<hr/> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Only required when not performed within previous [92] days</p> <hr/> <p>Prior to reactor startup</p> <p><u>AND</u></p> <p>Four hours after reducing power below P-6 for source range instrumentation</p> <p><u>AND</u></p> <p>[Twelve] hours after reducing power below P-10 for power and intermediate range instrumentation</p> <p><u>AND</u></p> <p>Every 92 days thereafter</p>
<p>SR 3.3.1.9</p> <hr/> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Verification of setpoint is not required.</p> <hr/> <p>Perform TADOT.</p>	<p>[92] days</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.10	<p>-----  <b>- NOTE -</b>  This Surveillance shall include verification that the time constants are adjusted to the prescribed values.  -----</p> <p>Perform CHANNEL CALIBRATION.</p>	[18] months
SR 3.3.1.11	<p>-----  <b>- NOTE -</b>  Neutron detectors are excluded from CHANNEL CALIBRATION.  -----</p> <p>Perform CHANNEL CALIBRATION.</p>	[18] months
SR 3.3.1.12	<p>-----  <b>- NOTE -</b>  This Surveillance shall include verification of Reactor Coolant System resistance temperature detector bypass loop flow rate.  -----</p> <p>Perform CHANNEL CALIBRATION.</p>	[18] months
SR 3.3.1.13	Perform COT.	18 months
SR 3.3.1.14	<p>-----  <b>- NOTE -</b>  Verification of setpoint is not required.  -----</p> <p>Perform TADOT.</p>	[18] months
SR 3.3.1.15	<p>-----  <b>- NOTE -</b>  Verification of setpoint is not required.  -----</p> <p>Perform TADOT.</p>	Prior to exceeding the [P-9] interlock whenever the unit has been in MODE 3, if not performed within the previous 31 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.1.16</p> <p>-----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Neutron detectors are excluded from response time testing.</p> <p>-----</p> <p>Verify RTS RESPONSE TIME is within limits.</p>	<p>[18] months on a STAGGERED TEST BASIS</p>

Table 3.3.1-1 (page 1 of 6)  
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
1. Manual Reactor Trip	1,2	2	B	SR 3.3.1.14	NA	NA
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	2	C	SR 3.3.1.14	NA	NA
2. Power Range Neutron Flux						
a. High	1,2	4	D	SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ [111.2]% RTP	[109]% RTP
b. Low	1 <sup>(b)</sup> , 2	4	E	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ [27.2]% RTP	[25]% RTP
3. Power Range Neutron Flux Rate						
a. High Positive Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11	≤ [6.8]% RTP with time constant ≥ [2] sec	[5]% RTP with time constant ≥ [2] sec
b. High Negative Rate	1,2	4	E	SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ [6.8]% RTP with time constant ≥ [2] sec	[5]% RTP with time constant ≥ [2] sec
4. Intermediate Range Neutron Flux	1 <sup>(b)</sup> , 2 <sup>(c)</sup>	2	F,G	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ [31]% RTP	[25]% RTP
5. Source Range Neutron Flux	2 <sup>(d)</sup>	2	H,I	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16	≤ [1.4 E5] cps	[1.0 E5] cps
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	2	I,J	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16	≤ [1.4 E5] cps	[1.0 E5] cps

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.



Table 3.3.1-1 (page 2 of 6)  
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
6. Overtemperature $\Delta T$	1,2	[4]	E	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.12 SR 3.3.1.16	Refer to Note 1 (Page 3.3.1-16)	Refer to Note 1 (Page 3.3.1-16)
7. Overpower $\Delta T$	1,2	[4]	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.12 SR 3.3.1.16	Refer to Note 2 (Page 3.3.1-17)	Refer to Note 2 (Page 3.3.1-17)
8. Pressurizer Pressure						
a. Low	1 <sup>(f)</sup>	[4]	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\geq$ [1886] psig	[1900] psig
b. High	1,2	[4]	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\leq$ [2396] psig	[2385] psig
9. Pressurizer Water Level - High	1 <sup>(e)</sup>	3	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10	$\leq$ [93.8]%	[92]%
10. Reactor Coolant Flow - Low	1 <sup>(f)</sup>	3 per loop	K	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	$\geq$ [89.2]%	[90]%
11. Reactor Coolant Pump (RCP) Breaker Position						
a. Single Loop	1 <sup>(f)</sup>	1 per RCP	L	SR 3.3.1.14	NA	NA
b. Two Loops	1 <sup>(g)</sup>	1 per RCP	K	SR 3.3.1.14	NA	NA

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(f) Above the P-8 (Power Range Neutron Flux) interlock.

(g) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) Interlock

Table 3.3.1-1 (page 3 of 6)  
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
12. Undervoltage RCPs	1 <sup>(e)</sup>	[3] per bus	K	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ [4760] V	[4830] V
13. Underfrequency RCPs	1 <sup>(e)</sup>	[3] per bus	K	SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16	≥ [57.1] Hz	[57.5] Hz
14. Steam Generator (SG) Water Level - Low Low	1,2	[4 per SG]	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ [30.4]%	[32.3]%
15. SG Water Level - Low	1,2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≥ [30.4]%	[32.3]%
Coincident with Steam Flow/ Feedwater Flow Mismatch	1,2	2 per SG	E	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16	≤ [42.5]% full steam flow at RTP	[40]% full steam flow at RTP
16. Turbine Trip						
a. Low Fluid Oil Pressure	1 <sup>(h)</sup>	3	M	SR 3.3.1.10 SR 3.3.1.15	≥ [750] psig	[800] psig
b. Turbine Stop Valve Closure	1 <sup>(h)</sup>	4	M	SR 3.3.1.10 SR 3.3.1.15	≥ [1]% open	[1]% open
17. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	2 trains	N	SR 3.3.1.14	NA	NA

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(h) Above the P-9 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 4 of 6)  
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL <sup>(a)</sup> TRIP SETPOINT
18. Reactor Trip System Interlocks						
a. Intermediate Range Neutron Flux, P-6	2 <sup>(d)</sup>	2	P	SR 3.3.1.11 SR 3.3.1.13	≥ [6E-11] amp	[1E-10] amp
b. Low Power Reactor Trips Block, P-7	1	1 per train	Q	SR 3.3.1.11 SR 3.3.1.13	NA	NA
c. Power Range Neutron Flux, P-8	1	4	Q	SR 3.3.1.11 SR 3.3.1.13	≤ [50.2]% RTP	[48]% RTP
d. Power Range Neutron Flux, P-9	1	4	Q	SR 3.3.1.11 SR 3.3.1.13	≤ [52.2]% RTP	[50]% RTP
e. Power Range Neutron Flux, P-10	1,2	4	P	SR 3.3.1.11 SR 3.3.1.13	≥ [7.8]% RTP and ≤ [12.2]% RTP	[10]% RTP
f. Turbine Impulse Pressure, P-13	1	2	Q	[SR 3.3.1.1] SR 3.3.1.10 SR 3.3.1.13	≤ [12.2]% turbine power	[10]% turbine power
19. Reactor Trip Breakers <sup>(i)</sup> (RTBs)	1,2 3 <sup>(b)</sup> , 4 <sup>(b)</sup> , 5 <sup>(b)</sup>	2 trains 2 trains	O C	SR 3.3.1.4 SR 3.3.1.4	NA NA	NA NA
20. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1,2 3 <sup>(b)</sup> , 4 <sup>(b)</sup> , 5 <sup>(b)</sup>	1 each per RTB 1 each per RTB	R C	SR 3.3.1.4 SR 3.3.1.4	NA NA	NA NA
21. Automatic Trip Logic	1,2 3 <sup>(b)</sup> , 4 <sup>(b)</sup> , 5 <sup>(b)</sup>	2 trains 2 trains	N C	SR 3.3.1.5 SR 3.3.1.5	NA NA	NA NA

(b) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(i) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

- REVIEWER'S NOTE -

(a) Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

Table 3.3.1-1 (page 5 of 6)  
Reactor Trip System Instrumentation

Note 1: Overtemperature  $\Delta T$

The Overtemperature  $\Delta T$  Function Allowable Value shall not exceed the following nominal Trip Setpoint by more than [3.8]% of  $\Delta T$  span.

$$\Delta T \frac{(1 + \tau_1 s)}{(1 + \tau_2 s)} \left( \frac{1}{1 + \tau_3 s} \right) \leq \Delta T_Q \left\{ K_1 - K_2 \frac{(1 + \tau_4 s)}{(1 + \tau_5 s)} \left[ T \frac{1}{(1 + \tau_6 s)} - T' \right] + K_3 (P - P') - f_1(\Delta I) \right\}$$

Where:  $\Delta T$  is measured RCS  $\Delta T$ , °F.  
 $\Delta T_Q$  is the indicated  $\Delta T$  at RTP, °F.  
 $s$  is the Laplace transform operator, sec<sup>-1</sup>.  
 $T$  is the measured RCS average temperature, °F.  
 $T'$  is the nominal  $T_{avg}$  at RTP,  $\leq$  [°]°F.

$P$  is the measured pressurizer pressure, psig  
 $P'$  is the nominal RCS operating pressure,  $\geq$  [°] psig

$K_1 \leq$ [°]	$K_2 \geq$ [°]/°F	$K_3 \geq$ [°]/psig
$\tau_1 \geq$ [°] sec	$\tau_2 \leq$ [°] sec	$\tau_3 \leq$ [°] sec
$\tau_4 \geq$ [°] sec	$\tau_5 \leq$ [°] sec	$\tau_6 \leq$ [°] sec

$f_1(\Delta I) =$ [°] {[°] + ( $q_t - q_b$ )}	when $q_t - q_b \leq -$ [°]% RTP
0% of RTP	when $-$ [°]% RTP $< q_t - q_b \leq$ [°]% RTP
$-$ [°] {( $q_t - q_b$ ) - [°]}	when $q_t - q_b >$ [°]% RTP

Where  $q_t$  and  $q_b$  are percent RTP in the upper and lower halves of the core, respectively, and  $q_t + q_b$  is the total THERMAL POWER in percent RTP.

\*These values denoted with [°] are specified in the COLR.

Table 3.3.1-1 (page 6 of 6)  
Reactor Trip System Instrumentation

Note 2: Overpower  $\Delta T$

The Overpower  $\Delta T$  Function Allowable Value shall not exceed the following nominal Trip Setpoint by more than [3]% of  $\Delta T$  span.

$$\Delta T \frac{(1 + \tau_1 s)}{(1 + \tau_2 s)} \left( \frac{1}{1 + \tau_3 s} \right) \leq \Delta T_Q \left\{ K_4 - K_5 \frac{\tau_7 s}{1 + \tau_7 s} \left( \frac{1}{1 + \tau_6 s} \right) T - K_6 \left[ T \frac{1}{1 + \tau_6 s} - T'' \right] - f_2(\Delta I) \right\}$$

Where:  $\Delta T$  is measured RCS  $\Delta T$ , °F.  
 $\Delta T_Q$  is the indicated  $\Delta T$  at RTP, °F.  
 $s$  is the Laplace transform operator, sec<sup>-1</sup>.  
 $T$  is the measured RCS average temperature, °F.  
 $T'$  is the nominal  $T_{avg}$  at RTP,  $\leq$  [°F].

$K_4 \leq$  [°F]  
 $K_5 \geq$  [°F]/°F for increasing  $T_{avg}$   
 $\quad$  [°F]/°F for decreasing  $T_{avg}$   
 $\tau_1 \geq$  [sec]  
 $\tau_2 \leq$  [sec]  
 $\tau_6 \leq$  [sec]  
 $\tau_7 \geq$  [sec]

$K_6 \geq$  [°F]/°F when  $T > T'$   
 $\quad$  [°F]/°F when  $T \leq T'$   
 $\tau_3 \leq$  [sec]

$f_2(\Delta I) =$  [°F]

\*These values denoted with [°F] are specified in the COLR.

### 3.3 INSTRUMENTATION

#### 3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1.

#### ACTIONS

**- NOTE -**

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels or trains inoperable.	A.1 Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s).	Immediately
B. One channel or train inoperable.	B.1 Restore channel or train to OPERABLE status.	48 hours
	<u>OR</u>	
	B.2.1 Be in MODE 3.	54 hours
	<u>AND</u>	
	B.2.2 Be in MODE 5.	84 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One train inoperable.	<p>-----  <b>- NOTE -</b>  One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE.  -----</p>	
	C.1      Restore train to OPERABLE status.	6 hours
	<u>OR</u>	
	C.2.1    Be in MODE 3.	12 hours
D. One channel inoperable.	<u>AND</u>	
	C.2.2    Be in MODE 5.	42 hours
	<p>-----  <b>- NOTE -</b>  The inoperable channel may be bypassed for up to [4] hours for surveillance testing of other channels.  -----</p>	
	D.1      Place channel in trip.	6 hours
	<u>OR</u>	
	D.2.1    Be in MODE 3.	12 hours
	<u>AND</u>	
	D.2.2    Be in MODE 4.	18 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One Containment Pressure channel inoperable.	<p>-----  <b>- NOTE -</b>  One additional channel may be bypassed for up to [4] hours for surveillance testing.  -----</p>	
	E.1 Place channel in bypass.	6 hours
	<u>OR</u>	
	E.2.1 Be in MODE 3.	12 hours
	<u>AND</u>	
	E.2.2 Be in MODE 4.	18 hours
F. One channel or train inoperable.	F.1 Restore channel or train to OPERABLE status.	48 hours
	<u>OR</u>	
	F.2.1 Be in MODE 3.	54 hours
	<u>AND</u>	
	F.2.2 Be in MODE 4.	60 hours
G. One train inoperable.	<p>-----  <b>- NOTE -</b>  One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE.  -----</p>	
	G.1 Restore train to OPERABLE status.	6 hours
	<u>OR</u>	



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	G.2.1 Be in MODE 3.  <u>AND</u> G.2.2 Be in MODE 4.	12 hours   18 hours
H. One train inoperable.	<p>-----  <b>- NOTE -</b>  One train may be bypassed for up to [4] hours for surveillance testing provided the other train is OPERABLE.  -----</p> H.1 Restore train to OPERABLE status.  <u>OR</u> H.2 Be in MODE 3.	6 hours   12 hours
I. One channel inoperable.	<p>-----  <b>- NOTE -</b>  The inoperable channel may be bypassed for up to [4] hours for surveillance testing of other channels.  -----</p> I.1 Place channel in trip.  <u>OR</u> I.2 Be in MODE 3.	6 hours   12 hours
J. One Main Feedwater Pumps trip channel inoperable.	J.1 Restore channel to OPERABLE status.  <u>OR</u> J.2 Be in MODE 3.	48 hours   54 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
K. One channel inoperable.	<p style="text-align: center;">-----  <b>- NOTE -</b>  One additional channel  may be bypassed for up to  [4] hours for surveillance  testing.  -----</p>	
	K.1 Place channel in bypass.	6 hours
	<u>OR</u>	
	K.2.1 Be in MODE 3.	12 hours
	<u>AND</u>	
	K.2.2 Be in MODE 5.	42 hours
L. One or more channels inoperable.	L.1 Verify interlock is in required state for existing unit condition.	1 hour
	<u>OR</u>	
	L.2.1 Be in MODE 3.	7 hours
	<u>AND</u>	
	L.2.2 Be in MODE 4.	13 hours

SURVEILLANCE REQUIREMENTS

-----  
**- NOTE -**  
-----

Refer to Table 3.3.2-1 to determine which SRs apply for each ESFAS Function.

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Perform CHANNEL CHECK.	12 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.3	<p>-----  <b>- NOTE -</b>  The continuity check may be excluded.  -----</p> <p>Perform ACTUATION LOGIC TEST.</p>	31 days on a STAGGERED TEST BASIS
SR 3.3.2.4	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.2.5	Perform COT.	92 days
SR 3.3.2.6	Perform SLAVE RELAY TEST.	[92] days
SR 3.3.2.7	<p>-----  <b>- NOTE -</b>  Verification of relay setpoints not required.  -----</p> <p>Perform TADOT.</p>	[92] days
SR 3.3.2.8	<p>-----  <b>- NOTE -</b>  Verification of setpoint not required for manual initiation functions.  -----</p> <p>Perform TADOT.</p>	[18] months
SR 3.3.2.9	<p>-----  <b>- NOTE -</b>  This Surveillance shall include verification that the time constants are adjusted to the prescribed values.  -----</p> <p>Perform CHANNEL CALIBRATION.</p>	[18] months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.3.2.10 -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Not required to be performed for the turbine driven AFW pump until [24] hours after SG pressure is <math>\geq</math> [1000] psig.</p> <p>-----</p> <p>Verify ESFAS RESPONSE TIMES are within limit.</p>	<p>[18] months on a STAGGERED TEST BASIS</p>
<p>SR 3.3.2.11 -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Verification of setpoint not required.</p> <p>-----</p> <p>Perform TADOT.</p>	<p>Once per reactor trip breaker cycle</p>

Table 3.3.2-1 (page 1 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
1. Safety Injection						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
c. Containment Pressure - High 1	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [3.86] psig	[3.6] psig
d. Pressurizer Pressure - Low	1,2,3 <sup>(a)</sup>	[3]	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [1839] psig	[1850] psig
e. Steam Line Pressure						
(1) Low	1,2,3 <sup>(a)</sup>	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [635] <sup>(b)</sup> psig	[675] <sup>(b)</sup> psig
(2) High Differential Pressure Between Steam Lines	1,2,3	3 per steam line	D	[SR 3.3.2.1] SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [106] psig	[97] psig

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are  $t_1 \geq [50]$  seconds and  $t_2 \leq [5]$  seconds.

(c) Above the P-12 ( $T_{avg}$  - Low Low) interlock.

(d) Less than or equal to a function defined as  $\Delta P$  corresponding to [44]% full steam flow below [20]% load, and  $\Delta P$  increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and  $\Delta P$  corresponding to [114]% full steam flow above 100% load.

(e) Less than or equal to a function defined as  $\Delta P$  corresponding to [40]% full steam flow between [0]% and [20]% load and then a  $\Delta P$  increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.

Table 3.3.2-1 (page 2 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
1. Safety Injection						
f. High Steam Flow in Two Steam Lines	1,2,3 <sup>(c)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	(d)	(e)
Coincident with T <sub>avg</sub> - Low Low	1,2,3 <sup>(c)</sup>	1 per loop	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [550.6]°F	[553]°F
g. High Steam Flow in Two Steam Lines	1,2,3 <sup>(c)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	(d)	(e)
Coincident with Steam Line Pressure - Low	1,2,3 <sup>(c)</sup>	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [635] <sup>(b)</sup> psig	[675] psig
2. Containment Spray						
a. Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.8	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
c. Containment Pressure High - 3 (High High)	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [12.31] psig	[12.05] psig

(b) Time constants used in the lead/lag controller are  $t_1 \geq [50]$  seconds and  $t_2 \leq [5]$  seconds.

(c) Above the P-12 (T<sub>avg</sub> - Low Low) interlock.

(d) Less than or equal to a function defined as  $\Delta P$  corresponding to [44]% full steam flow below [20]% load, and  $\Delta P$  increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and  $\Delta P$  corresponding to [114]% full steam flow above 100% load.

(e) Less than or equal to a function defined as  $\Delta P$  corresponding to [40]% full steam flow between [0]% and [20]% load and then a  $\Delta P$  increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.

Table 3.3.2-1 (page 3 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
2. Containment Spray						
c. Containment Pressure High - 3 (Two Loop Plants)	1,2,3	[3] sets of [2]	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [12.31] psig	[12.05] psig
3. Containment Isolation						
a. Phase A Isolation						
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
b. Phase B Isolation						
(1) Manual Initiation	1,2,3,4	2 per train, 2 trains	B	SR 3.3.2.8	NA	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
(3) Containment Pressure High - 3 (High High)	1,2,3	[4]	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [12.31] psig	[12.05] psig

Table 3.3.2-1 (page 4 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
4. Steam Line Isolation						
a. Manual Initiation	1,2 <sup>(h)</sup> , 3 <sup>(h)</sup>	2	F	SR 3.3.2.8	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2 <sup>(h)</sup> , 3 <sup>(h)</sup>	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
c. Containment Pressure - High 2	1, 2 <sup>(h)</sup> , 3 <sup>(h)</sup>	[4]	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [6.61] psig	[6.35] psig
d. Steam Line Pressure						
(1) Low	1, 2 <sup>(h)</sup> , 3 <sup>(a) (h)</sup>	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [635] <sup>(b)</sup> psig	[675] <sup>(b)</sup> psig
(2) Negative Rate - High	3 <sup>(f) (h)</sup>	3 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [121.6] <sup>(g)</sup> psi/sec	[110] <sup>(g)</sup> psi/sec

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are  $t_1 \geq [50]$  seconds and  $t_2 \leq [5]$  seconds.

(f) Below the P-11 (Pressurizer Pressure) interlock.

(g) Time constant utilized in the rate/lag controller is  $\geq [50]$  seconds.

(h) Except when all MSIVs are closed and [de-activated].



Table 3.3.2-1 (page 5 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITION S	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
4. Steam Line Isolation						
e. High Steam Flow in Two Steam Lines	1, 2 <sup>(h)</sup> , 3 <sup>(h)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	(d)	(e)
Coincident with T <sub>avg</sub> - Low Low	1, 2 <sup>(h)</sup> , 3 <sup>(c) (h)</sup>	1 per loop	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [550.6]°F	[553]°F
f. High Steam Flow in Two Steam Lines	1, 2 <sup>(h)</sup> , 3 <sup>(h)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	(d)	(e)
Coincident with Steam Line Pressure - Low	1, 2 <sup>(h)</sup> , 3 <sup>(h)</sup>	1 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [635] <sup>(b)</sup> psig	[675] <sup>(b)</sup> psig
g. High Steam Flow	1, 2 <sup>(h)</sup> , 3 <sup>(h)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [25]% of full steam flow at no load steam pressure	[ ] full steam flow at no load steam pressure
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
and						
Coincident with T <sub>avg</sub> - Low Low	1, 2 <sup>(h)</sup> , 3 <sup>(c) (h)</sup>	[2] per loop	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [550.6]°F	[553]°F

(b) Time constants used in the lead/lag controller are t<sub>1</sub> ≥ [50] seconds and t<sub>2</sub> ≤ [5] seconds.

(c) Above the P-12 (T<sub>avg</sub> - Low Low) interlock.

(d) Less than or equal to a function defined as ΔP corresponding to [44]% full steam flow below [20]% load, ΔP increasing linearly from [44]% full steam flow at [20]% load to [114]% full steam flow at [100]% load, and ΔP corresponding to [114]% full steam flow above 100% load.

(e) Less than or equal to a function defined as ΔP corresponding to [40]% full steam flow between [0]% and [20]% load and then a ΔP increasing linearly from [40]% steam flow at [20]% load to [110]% full steam flow at [100]% load.

(h) Except when all MSIVs are closed and [de-activated].

Table 3.3.2-1 (page 6 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
4. Steam Line Isolation						
h. High High Steam Flow	1,2 <sup>(h)</sup> , 3 <sup>(h)</sup>	2 per steam line	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [130]% of full steam flow at full load steam pressure	[ ] of full steam flow at full load steam pressure
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
5. Turbine Trip and Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	1, 2 <sup>(i)</sup> , [3] <sup>(i)</sup>	2 trains	H[G]	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. SG Water Level - High High (P-14)	1,2 <sup>(i)</sup> , [3] <sup>(i)</sup>	[3] per SG	I[D]	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ [84.2]%	[82.4]%
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
6. Auxiliary Feedwater						
a. Automatic Actuation Logic and Actuation Relays (Solid State Protection System)	1,2,3	2 trains	G	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. Automatic Actuation Logic and Actuation Relays (Balance of Plant ESFAS)	1,2,3	2 trains	G	SR 3.3.2.3	NA	NA

(h) Except when all MSIVs are closed and [de-activated].

(i) Except when all MFIVs, MFRVs, [and associated bypass valves] are closed and [de-activated] [or isolated by a closed manual valve].

Table 3.3.2-1 (page 7 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
6. Auxiliary Feedwater						
c. SG Water Level - Low Low	1,2,3	[3] per SG	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [30.4]%	[32.2]%
d. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
e. Loss of Offsite Power	1,2,3	[3] per bus	F	SR 3.3.2.7 SR 3.3.2.9 SR 3.3.2.10	≥ [2912] V with ≤ 0.8 sec time delay	[2975] V with ≤ 0.8 sec time delay
f. Undervoltage Reactor Coolant Pump	1,2	[3] per bus	I	SR 3.3.2.7 SR 3.3.2.9 SR 3.3.2.10	≥ [69]% bus voltage	[70]% bus voltage
g. Trip of all Main Feedwater Pumps	1,2	[2] per pump	J	SR 3.3.2.8 SR 3.3.2.9 SR 3.3.2.10	≥ [ ] psig	[ ] psig
h. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low	1,2,3	[2]	F	SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9	≥ [20.53] [psia]	[ ] [psia]
7. Automatic Switchover to Containment Sump						
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
b. Refueling Water Storage Tank (RWST) Level - Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [15]% and ≤ [ ]%	[ ]% and [ ]%
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					

Table 3.3.2-1 (page 8 of 8)  
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
7. Automatic Switchover to Containment Sump						
c. RWST Level - Low Low	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [15]%	[18]%
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					
and						
Coincident with Containment Sump Level - High	1,2,3,4	4	K	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ [30] in. above el. [703] ft	[ ] in. above el. [ ] ft
8. ESFAS Interlocks						
a. Reactor Trip, P-4	1,2,3	1 per train, 2 trains	F	SR 3.3.2.11	NA	NA
b. Pressurizer Pressure, P-11	1,2,3	3	L	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≤ [1996] psig	[ ] psig
c. T <sub>avg</sub> - Low Low, P-12	1,2,3	[1] per loop	L	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9	≥ [550.6]°F	[553]°F

- REVIEWER'S NOTE -

Unit specific implementations may contain only Allowable Value depending on Setpoint Study methodology used by the unit.

### 3.3 INSTRUMENTATION

#### 3.3.3 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3 The PAM instrumentation for each Function in Table 3.3.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

##### - NOTES -

1. LCO 3.0.4 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.7.	Immediately
C. ----- - NOTE - Not applicable to hydrogen monitor channels. -----  One or more Functions with two required channels inoperable.	C.1 Restore one channel to OPERABLE status.	7 days
D. Two hydrogen monitor channels inoperable.	D.1 Restore one hydrogen monitor channel to OPERABLE status.	72 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition C or D not met.	E.1 Enter the Condition referenced in Table 3.3.3-1 for the channel.	Immediately
F. As required by Required Action E.1 and referenced in Table 3.3.3-1.	F.1 Be in MODE 3.	6 hours
	<u>AND</u> F.2 Be in MODE 4.	12 hours
G. As required by Required Action E.1 and referenced in Table 3.3.3-1.	G.1 Initiate action in accordance with Specification 5.6.7.	Immediately

SURVEILLANCE REQUIREMENTS

- NOTE -

SR 3.3.3.1 and SR 3.3.3.2 apply to each PAM instrumentation Function in Table 3.3.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	- NOTE - Neutron detectors are excluded from CHANNEL CALIBRATION.	[18] months
	Perform CHANNEL CALIBRATION.	

Table 3.3.3-1 (page 1 of 1)  
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION E.1
1. Power Range Neutron Flux	2	F
2. Source Range Neutron Flux	2	F
3. Reactor Coolant System (RCS) Hot Leg Temperature	2 per loop	F
4. RCS Cold Leg Temperature	2 per loop	F
5. RCS Pressure (Wide Range)	2	F
6. Reactor Vessel Water Level	2	G
7. Containment Sump Water Level (Wide Range)	2	F
8. Containment Pressure (Wide Range)	2	F
9. Penetration Flow Path Containment Isolation Valve Position	2 per penetration flow path <sup>(a)(b)</sup>	F
10. Containment Area Radiation (High Range)	2	G
11. Hydrogen Monitors	2	F
12. Pressurizer Level	2	F
13. Steam Generator Water Level (Wide Range)	2 per steam generator	F
14. Condensate Storage Tank Level	2	F
15. Core Exit Temperature - Quadrant [1]	2 <sup>(c)</sup>	F
16. Core Exit Temperature - Quadrant [2]	2 <sup>(c)</sup>	F
17. Core Exit Temperature - Quadrant [3]	2 <sup>(c)</sup>	F
18. Core Exit Temperature - Quadrant [4]	2 <sup>(c)</sup>	F
19. Auxiliary Feedwater Flow	2	F

(a) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

(c) A channel consists of two core exit thermocouples (CETs).

- REVIEWER'S NOTE -

Table 3.3.3-1 shall be amended for each unit as necessary to list:

1. All Regulatory Guide 1.97, Type A instruments and
2. All Regulatory Guide 1.97, Category I, non-Type A instruments in accordance with the unit's Regulatory Guide 1.97, Safety Evaluation Report.

### 3.3 INSTRUMENTATION

#### 3.3.4 Remote Shutdown System

LCO 3.3.4 The Remote Shutdown System Functions shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

##### - NOTES -

1. LCO 3.0.4 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required Functions inoperable.	A.1 Restore required Function to OPERABLE status.	30 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 4.	12 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.1	[ Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days ]
SR 3.3.4.2	Verify each required control circuit and transfer switch is capable of performing the intended function.	[18] months



SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.4.3	<p>----- - NOTE - Neutron detectors are excluded from CHANNEL CALIBRATION. -----</p> <p>Perform CHANNEL CALIBRATION for each required instrumentation channel.</p>	[18] months
SR 3.3.4.4	[ Perform TADOT of the reactor trip breaker open/closed indication.	18 months ]

### 3.3 INSTRUMENTATION

#### 3.3.5 Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation

LCO 3.3.5 [Three] channels per bus of the loss of voltage Function and [three] channels per bus of the degraded voltage Function shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4,  
When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources - Shutdown."

#### ACTIONS

**- NOTE -**

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel per bus inoperable.	<p>A.1</p> <p><b>- NOTE -</b> The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.</p> <p>Place channel in trip.</p>	6 hours
B. One or more Functions with two or more channels per bus inoperable.	B.1 Restore all but one channel per bus to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.5.1	[ Perform CHANNEL CHECK.	12 hours ]
SR 3.3.5.2	Perform TADOT.	[31] days
SR 3.3.5.3	<p>Perform CHANNEL CALIBRATION with [Nominal Trip Setpoint and Allowable Value] as follows:</p> <p>a. [ Loss of voltage Allowable Value <math>\geq</math> [2912] V and <math>\leq</math> [ ] V with a time delay of [0.8] <math>\pm</math> [ ] second.</p> <p>Loss of voltage Nominal Trip Setpoint [2975] V with a time delay of [0.8] <math>\pm</math> [ ] second. ]</p> <p>b. [ Degraded voltage Allowable Value <math>\geq</math> [3683] V and <math>\leq</math> [ ] V with a time delay of [20] <math>\pm</math> [ ] seconds.</p> <p>Degraded voltage Nominal Trip Setpoint [3746] V with a time delay of [20] <math>\pm</math> [ ] seconds. ]</p>	[18] months

### 3.3 INSTRUMENTATION

#### 3.3.6 Containment Purge and Exhaust Isolation Instrumentation

LCO 3.3.6            The Containment Purge and Exhaust Isolation instrumentation for each Function in Table 3.3.6-1 shall be OPERABLE.

APPLICABILITY:    According to Table 3.3.6-1.

#### ACTIONS

- NOTE -

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One radiation monitoring channel inoperable.	A.1 Restore the affected channel to OPERABLE status.	4 hours
<p>B. -----</p> <p style="text-align: center;">- NOTE -</p> <p>Only applicable in MODE 1, 2, 3, or 4.</p> <p>-----</p> <p>One or more Functions with one or more manual or automatic actuation trains inoperable.</p> <p><u>OR</u></p> <p>Two or more radiation monitoring channels inoperable.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition A not met.</p>	B.1 Enter applicable Conditions and Required Actions of LCO 3.6.3, "Containment Isolation Valves," for containment purge and exhaust isolation valves made inoperable by isolation instrumentation.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Only applicable during movement of [recently] irradiated fuel assemblies within containment.</p> <p>-----</p> <p>One or more Functions with one or more manual or automatic actuation trains inoperable.</p> <p><u>OR</u></p> <p>Two or more radiation monitoring channels inoperable.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time for Condition A not met.</p>	<p>C.1 Place and maintain containment purge and exhaust valves in closed position.</p> <p><u>OR</u></p> <p>C.2 Enter applicable Conditions and Required Actions of LCO 3.9.4, "Containment Penetrations," for containment purge and exhaust isolation valves made inoperable by isolation instrumentation.</p>	<p>Immediately</p> <p>Immediately</p>

**- NOTE -**

Refer to Table 3.3.6-1 to determine which SRs apply for each Containment Purge and Exhaust Isolation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.6.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.3	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.4	Perform COT.	92 days
SR 3.3.6.5	Perform SLAVE RELAY TEST.	[92] days
SR 3.3.6.6	<div style="border: 1px dashed black; padding: 5px; text-align: center;"> <b>- NOTE -</b>                      Verification of setpoint is not required.                 </div> Perform TADOT.	[18] months
SR 3.3.6.7	Perform CHANNEL CALIBRATION.	[18] months

Containment Purge and Exhaust Isolation Instrumentation  
3.3.6

Table 3.3.6-1 (page 1 of 1)  
Containment Purge and Exhaust Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1,2,3,4, (a)	2	SR 3.3.6.6	NA
2. Automatic Actuation Logic and Actuation Relays	1,2,3,4, (a)	2 trains	SR 3.3.6.2 SR 3.3.6.3 SR 3.3.6.5	NA
3. [ Containment Radiation				
a. Gaseous	1,2,3,4, (a)	[1]	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ [2 x background]
b. Particulate	1,2,3,4, (a)	[1]	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ [2 x background]
c. Iodine	1,2,3,4, (a)	[1]	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ [2 x background]
d. Area Radiation	1,2,3,4, (a)	[1]	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ [2 x background] ]
4. Containment Isolation - Phase A	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 3.a., for all initiation functions and requirements.			

(a) During movement of [recently] irradiated fuel assemblies within containment.

### 3.3 INSTRUMENTATION

#### 3.3.7 Control Room Emergency Filtration System (CREFS) Actuation Instrumentation

LCO 3.3.7 The CREFS actuation instrumentation for each Function in Table 3.3.7-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.7-1.

#### ACTIONS

- NOTE -

Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel or train inoperable.	<p>A.1</p> <p style="text-align: center;">- NOTE -</p> <p>[ Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable. ]</p> <p>Place one CREFS train in emergency [radiation protection] mode.</p>	7 days
B. One or more Functions with two channels or two trains inoperable.	<p style="text-align: center;">- NOTE -</p> <p>[ Place in the toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable. ]</p> <p>B.1.1 Place one CREFS train in emergency [radiation protection] mode.</p> <p><u>AND</u></p>	Immediately



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.1.2 Enter applicable Conditions and Required Actions for one CREFS train made inoperable by inoperable CREFS actuation instrumentation.	Immediately
	<u>OR</u> B.2 Place both trains in emergency [radiation protection] mode.	Immediately
C. Required Action and associated Completion Time for Condition A or B not met in MODE 1, 2, 3, or 4.	C.1 Be in MODE 3.	6 hours
	<u>AND</u> C.2 Be in MODE 5.	36 hours
D. Required Action and associated Completion Time for Condition A or B not met during movement of [recently] irradiated fuel assemblies.	D.1 Suspend movement of [recently] irradiated fuel assemblies.	Immediately
E. [ Required Action and associated Completion Time for Condition A or B not met in MODE 5 or 6.	E.1 Initiate action to restore one CREFS train to OPERABLE status.	Immediately ]

SURVEILLANCE REQUIREMENTS

**- NOTE -**

Refer to Table 3.3.7-1 to determine which SRs apply for each CREFS Actuation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.7.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.7.2	Perform COT.	92 days
SR 3.3.7.3	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.7.4	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.7.5	Perform SLAVE RELAY TEST.	[92] days
SR 3.3.7.6	<p><b>- NOTE -</b> Verification of setpoint is not required.</p> <p>Perform TADOT.</p>	[18] months
SR 3.3.7.7	Perform CHANNEL CALIBRATION.	[18] months

Table 3.3.7-1 (page 1 of 1)  
CREFS Actuation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1, 2, 3, 4, [5, 6], (a)	2 trains	SR 3.3.7.6	NA
2. Automatic Actuation Logic and Actuation Relays	1, 2, 3, 4, [5, 6], (a)	2 trains	SR 3.3.7.3 SR 3.3.7.4 SR 3.3.7.5	NA
3. Control Room Radiation				
a. Control Room Atmosphere	1, 2, 3, 4 [5, 6], (a)	[2]	SR 3.3.7.1 SR 3.3.7.2 SR 3.3.7.7	≤ [2] mR/hr
b. Control Room Air Intakes	1, 2, 3, 4, [5, 6], (a)	[2]	SR 3.3.7.1 SR 3.3.7.2 SR 3.3.7.7	≤ [2] mR/hr
4. Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.			

(a) During movement of [recently] irradiated fuel assemblies.

### 3.3 INSTRUMENTATION

#### 3.3.8 Fuel Building Air Cleanup System (FBACS) Actuation Instrumentation

LCO 3.3.8 The FBACS actuation instrumentation for each Function in Table 3.3.8-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.8-1.

#### ACTIONS

##### - NOTES -

1. LCO 3.0.3 is not applicable.
2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one channel or train inoperable.	A.1 Place one FBACS train in operation.	7 days
B. One or more Functions with two channels or two trains inoperable.	B.1.1 Place one FBACS train in operation.	Immediately
	<u>AND</u>	
	B.1.2 Enter applicable Conditions and Required Actions of LCO 3.7.13, "Fuel Building Air Cleanup System (FBACS)," for one train made inoperable by inoperable actuation instrumentation.	Immediately
	<u>OR</u>	
	B.2 Place both trains in emergency [radiation protection] mode.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time for Condition A or B not met during movement of [recently] irradiated fuel assemblies in the fuel building.	C.1 Suspend movement of [recently] irradiated fuel assemblies in the fuel building.	Immediately
D. [ Required Action and associated Completion Time for Condition A or B not met in MODE 1, 2, 3, or 4.	D.1 Be in MODE 3.  <u>AND</u> D.2 Be in MODE 5.	6 hours   36 hours ]

SURVEILLANCE REQUIREMENTS

- NOTE -

Refer to Table 3.3.8-1 to determine which SRs apply for each FBACS Actuation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.8.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.8.2	Perform COT.	92 days
SR 3.3.8.3	[Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS ]
SR 3.3.8.4	<div style="text-align: center;"> <p>- NOTE -</p> <p>Verification of setpoint is not required.</p> </div> Perform TADOT.	[18] months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.8.5	Perform CHANNEL CALIBRATION.	[18] months

Table 3.3.8-1 (page 1 of 1)  
FBACS Actuation Instrumentation

FUNCTION	APPLICABLE MODES OR SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	[1,2,3,4], (a)	2	SR 3.3.8.4	NA
2. [ Automatic Actuation Logic and Actuation Relays	1,2,3,4, (a)	2 trains	SR 3.3.8.3	NA ]
3. Fuel Building Radiation				
a. Gaseous	[1,2,3,4], (a)	[2]	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.5	≤ [2] mR/hr
b. Particulate	[1,2,3,4], (a)	[2]	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.5	≤ [2] mR/hr

(a) During movement of [recently] irradiated fuel assemblies in the fuel building.

**LCO 3.3.9** Two trains of the BDPS shall be OPERABLE.

**APPLICABILITY:** MODES [2,] 3, 4, and 5.

**- NOTE -**

The boron dilution flux doubling signal may be blocked in MODES 2 and 3 during reactor startup.

[illegible]



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.2.2.1 Close unborated water source isolation valves.	1 hour
	<u>AND</u>	
	B.2.2.2 Perform SR 3.1.1.1.	1 hour
		<u>AND</u>
		Once per 12 hours thereafter

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.9.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.9.2	Perform COT.	[92] days
SR 3.3.9.3	<p>-----</p> <p><b>- NOTE -</b></p> <p>Neutron detectors are excluded from CHANNEL CALIBRATION.</p> <p>-----</p> <p>Perform CHANNEL CALIBRATION.</p>	[18] months

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits

- LCO 3.4.1      RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified below:
- a. Pressurizer pressure is greater than or equal to the limit specified in the COLR,
  - b. RCS average temperature is less than or equal to the limit specified in the COLR, and
  - c. RCS total flow rate  $\geq$  [284,000] gpm and greater than or equal to the limit specified in the COLR.

APPLICABILITY:      MODE 1.

-----  
**- NOTE -**

Pressurizer pressure limit does not apply during either:

- a. THERMAL POWER ramp > 5% RTP per minute or
  - b. THERMAL POWER step > 10% RTP.
- 

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more RCS DNB parameters not within limits.	A.1 Restore RCS DNB parameter(s) to within limit.	2 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 2.	6 hours

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.4.1.1	Verify pressurizer pressure is greater than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.2	Verify RCS average temperature is less than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.3	Verify RCS total flow rate is $\geq$ [284,000] gpm and greater than or equal to the limit specified in the COLR.	12 hours
SR 3.4.1.4	<div style="text-align: center;">-----  <b>- NOTE -</b>                      Not required to be performed until 24 hours after <math>\geq</math> [90]% RTP.                      -----</div> Verify by precision heat balance that RCS total flow rate is $\geq$ [284,000] gpm and greater than or equal to the limit specified in the COLR.	[18] months

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.2 RCS Minimum Temperature for Criticality

LCO 3.4.2 Each RCS loop average temperature ( $T_{avg}$ ) shall be  $\geq [541]^{\circ}\text{F}$ .

APPLICABILITY: MODE 1,  
MODE 2 with  $k_{eff} \geq 1.0$ .

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. $T_{avg}$ in one or more RCS loops not within limit.	A.1 Be in MODE 2 with $K_{eff} < 1.0$ .	30 minutes

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.2.1 Verify RCS $T_{avg}$ in each loop $\geq [541]^{\circ}\text{F}$ .	12 hours

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.3 RCS Pressure and Temperature (P/T) Limits

LCO 3.4.3 RCS pressure, RCS temperature, and RCS heatup and cooldown rates shall be maintained within the limits specified in the PTLR.

APPLICABILITY: At all times.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----- <b>- NOTE -</b> Required Action A.2 shall be completed whenever this Condition is entered. ----- Requirements of LCO not met in MODE 1, 2, 3, or 4.	A.1 Restore parameter(s) to within limits.	30 minutes
	AND A.2 Determine RCS is acceptable for continued operation.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND B.2 Be in MODE 5 with RCS pressure < [500] psig.	36 hours
C. ----- <b>- NOTE -</b> Required Action C.2 shall be completed whenever this Condition is entered. ----- Requirements of LCO not met any time in other than MODE 1, 2, 3, or 4.	C.1 Initiate action to restore parameter(s) to within limits. AND	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2 Determine RCS is acceptable for continued operation.	Prior to entering MODE 4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.3.1</p> <p style="text-align: center;">----- - NOTE - -----</p> <p>Only required to be performed during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing.</p> <p style="text-align: center;">-----</p> <p>Verify RCS pressure, RCS temperature, and RCS heatup and cooldown rates are within the limits specified in the PTLR.</p>	30 minutes

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.4 RCS Loops - MODES 1 and 2

LCO 3.4.4 [Four] RCS loops shall be OPERABLE and in operation.

APPLICABILITY: MODES 1 and 2.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of LCO not met.	A.1 Be in MODE 3.	6 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.4.1 Verify each RCS loop is in operation.	12 hours

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.5 RCS Loops - MODE 3

LCO 3.4.5 [Two] RCS loops shall be OPERABLE and either:

- a. [Two] RCS loops shall be in operation when the Rod Control System is capable of rod withdrawal or
- b. One RCS loop shall be in operation when the Rod Control System is not capable of rod withdrawal.

-----  
**- NOTE -**

All reactor coolant pumps may be not in operation for  $\leq 1$  hour per 8 hour period provided:

- a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and
  - b. Core outlet temperature is maintained at least 10°F below saturation temperature.
- 

APPLICABILITY: MODE 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One [required] RCS loop inoperable.	A.1 Restore required RCS loop to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 4.	12 hour



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. [ One required RCS loop not in operation with Rod Control System capable of rod withdrawal.	C.1 Restore required RCS loop to operation.	1 hour
	<u>OR</u>  C.2 Place the Rod Control System in a condition incapable of rod withdrawal.	1 hour ]
D. [Two] [required] RCS loops inoperable.  <u>OR</u>  [Required] RCS loop(s) not in operation.	D.1 Place the Rod Control System in a condition incapable of rod withdrawal.	Immediately
	<u>AND</u>  D.2 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately
	<u>AND</u>  D.3 Initiate action to restore one RCS loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.5.1      Verify required RCS loops are in operation.	12 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.5.2	Verify steam generator secondary side water levels are $\geq$ [17]% for required RCS loops.	12 hours
SR 3.4.5.3	<p>-----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Not required to be performed until 24 hours after a required pump is not in operation.</p> <p>-----</p> <p>Verify correct breaker alignment and indicated power are available to each required pump.</p>	7 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.6 RCS Loops - MODE 4

LCO 3.4.6 Two loops consisting of any combination of RCS loops and residual heat removal (RHR) loops shall be OPERABLE, and one loop shall be in operation.

-----  
**- NOTES -**

1. All reactor coolant pumps (RCPs) and RHR pumps may be not in operation for  $\leq 1$  hour per 8 hour period provided:
    - a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1, and
    - b. Core outlet temperature is maintained at least 10°F below saturation temperature.
  2. No RCP shall be started with any RCS cold leg temperature  $\leq [275^{\circ}\text{F}]$  [Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR] unless the secondary side water temperature of each steam generator (SG) is  $\leq [50]^{\circ}\text{F}$  above each of the RCS cold leg temperatures.
- 

APPLICABILITY: MODE 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required loop inoperable.	A.1 Initiate action to restore a second loop to OPERABLE status.  <u>AND</u>	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	<p>A.2</p> <p style="text-align: center;">----- - NOTE - Only required if RHR loop is operable. -----</p> <p>Be in Mode 5.</p>	24 hours
<p>B. Two required loops inoperable.</p> <p><u>OR</u></p> <p>Required loop not in operation.</p>	<p>B.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1</p> <p><u>AND</u></p> <p>B.2 Initiate action to restore one loop to OPERABLE status and operation.</p>	<p>Immediately</p> <p>Immediately</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.6.1	Verify required RHR or RCS loop is in operation.	12 hours
SR 3.4.6.2	Verify SG secondary side water levels are $\geq$ [17]% for required RCS loops.	12 hours
SR 3.4.6.3	<p style="text-align: center;">----- - NOTE - Not required to be performed until 24 hours after a required pump is not in operation. -----</p> <p>Verify correct breaker alignment and indicated power are available to each required pump.</p>	7 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.7 RCS Loops - MODE 5, Loops Filled

LCO 3.4.7 One residual heat removal (RHR) loop shall be OPERABLE and in operation, and either:

- a. The non-operating RHR loop shall be OPERABLE or
- b. The secondary side water level of at least [two] steam generators (SGs) shall be  $\geq$  [17]%.

---

**- NOTES -**

1. The RHR pump of the loop in operation may be not in operation for  $\leq$  1 hour per 8 hour period provided:
    - a. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1; and
    - b. Core outlet temperature is maintained at least 10°F below saturation temperature.
  2. One required RHR loop may be inoperable for up to 2 hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.
  3. No reactor coolant pump shall be started with one or more RCS cold leg temperatures  $\leq$  [275°F] [Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR] unless the secondary side water temperature of each SG is  $\leq$  [50]°F above each of the RCS cold leg temperatures.
  4. All RHR loops may be removed from operation during planned heatup to MODE 4 when at least one RCS loop is in operation.
- 

APPLICABILITY: MODE 5 with RCS Loops Filled

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One required RHR loop inoperable.</p> <p><u>AND</u></p> <p>One RHR loop OPERABLE.</p>	<p>A.1 Initiate action to restore a second RHR loop to OPERABLE status.</p>	Immediately
	<p><u>OR</u></p> <p>A.2 Initiate action to restore required SGs secondary side water level to within limit.</p>	Immediately
<p>B. One or more required SGs with secondary side water level not within limit.</p> <p><u>AND</u></p> <p>One RHR loop OPERABLE.</p>	<p>B.1 Initiate action to restore a second RHR loop to OPERABLE status.</p>	Immediately
	<p><u>OR</u></p> <p>B.2 Initiate action to restore required SGs secondary side water level to within limit.</p>	Immediately
<p>C. No required RHR loops OPERABLE.</p> <p><u>OR</u></p> <p>Required RHR loop not in operation.</p>	<p>C.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.</p>	Immediately
	<p><u>AND</u></p> <p>C.2 Initiate action to restore one RHR loop to OPERABLE status and operation.</p>	Immediately

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Verify required RHR loop is in operation.	12 hours
SR 3.4.7.2	Verify SG secondary side water level is $\geq$ [17]% in required SGs.	12 hours
SR 3.4.7.3	<p style="text-align: center;">-----  <b>- NOTE -</b>                      Not required to be performed until 24 hours after a required pump is not in operation.                      -----</p> <p>Verify correct breaker alignment and indicated power are available to each required RHR pump.</p>	7 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.8 RCS Loops - MODE 5, Loops Not Filled

LCO 3.4.8 Both residual heat removal (RHR) loops shall be OPERABLE and one RHR loop shall be in operation.

-----  
**- NOTES -**

1. All RHR pumps may be not in operation for  $\leq 15$  minutes when switching from one loop to another provided:
    - [ a. The core outlet temperature is maintained  $> 10^{\circ}\text{F}$  below saturation temperature, ]
    - b. No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1, and
    - c. No draining operations to further reduce the RCS water volume are permitted.
  2. One RHR loop may be inoperable for  $\leq 2$  hours for surveillance testing provided that the other RHR loop is OPERABLE and in operation.
- 

APPLICABILITY: MODE 5 with RCS loops not filled.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required RHR loop inoperable.	A.1 Initiate action to restore RHR loop to OPERABLE status.	Immediately



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. No required RHR loop OPERABLE.  <u>OR</u>  Required RHR loop not in operation.	B.1 Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1.	Immediately
	<u>AND</u>  B.2 Initiate action to restore one RHR loop to OPERABLE status and operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.8.1	Verify required RHR loop is in operation.	12 hours
SR 3.4.8.2	----- <p style="text-align: center;"><b>- NOTE -</b></p> Not required to be performed until 24 hours after a required pump is not in operation. -----  Verify correct breaker alignment and indicated power are available to each required RHR pump.	7 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

- a. Pressurizer water level  $\leq$  [92]% and
- b. [Two groups of] pressurizer heaters OPERABLE with the capacity [of each group]  $\geq$  [125] kW [and capable of being powered from an emergency power supply].

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Pressurizer water level not within limit.	A.1 Be in MODE 3. <u>AND</u>	6 hours
	A. 2 Fully insert all rods. <u>AND</u>	6 hours
	A.3 Place Rod Control System in a condition incapable of rod withdrawal. <u>AND</u>	6 hours
	A.4 Be in MODE 4.	12 hours
B. One [required] group of pressurizer heaters inoperable.	B.1 Restore [required] group of pressurizer heaters to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3. <u>AND</u>	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	C.2 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.9.1	Verify pressurizer water level is $\leq$ [92]%.  ----- <b>- REVIEWER'S NOTE -</b> The frequency for performing Pressurizer heater capacity testing shall be either 18 months or 92 days, depending on whether or not the plant has dedicated safety-related heaters. For dedicated safety-related heaters, which do not normally operate, 92 days is applied. For non-dedicated safety-related heaters, which normally operate, 18 months is applied. -----	12 hours
SR 3.4.9.2	Verify capacity of each required group of pressurizer heaters is $\geq$ [125] kW.	[18] months
SR 3.4.9.3	[ Verify required pressurizer heaters are capable of being powered from an emergency power supply.	[18] months ]

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.10 Pressurizer Safety Valves

LCO 3.4.10 [Three] pressurizer safety valves shall be OPERABLE with lift settings  $\geq$  [2460] psig and  $\leq$  [2510] psig.

APPLICABILITY: MODES 1, 2, and 3,  
MODE 4 with all RCS cold leg temperatures  $>$  [275°F] [Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR].

- NOTE -

The lift settings are not required to be within the LCO limits during MODES 3 and 4 for the purpose of setting the pressurizer safety valves under ambient (hot) conditions. This exception is allowed for [54] hours following entry into MODE 3 provided a preliminary cold setting was made prior to heatup.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pressurizer safety valve inoperable.	A.1 Restore valve to OPERABLE status.	15 minutes
B. Required Action and associated Completion Time not met.  <u>OR</u>  Two or more pressurizer safety valves inoperable.	B.1 Be in MODE 3.  <u>AND</u>  B.2 Be in MODE 4 with any RCS cold leg temperatures $\leq$ LTOP arming temperature specified in the PTLR.	6 hours   [24] hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.10.1	Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be within $\pm 1\%$ .	In accordance with the Inservice Testing Program

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

##### - NOTES -

1. Separate Condition entry is allowed for each PORV.
2. LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to associated block valve.	1 hour
B. One [or two] PORV[s] inoperable and not capable of being manually cycled.	B.1 Close associated block valve[s].	1 hour
	<u>AND</u>	
	B.2 Remove power from associated block valve[s].	1 hour
	<u>AND</u>	
	B.3 Restore PORV[s] to OPERABLE status.	72 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One block valve inoperable.	<p>-----  <b>- NOTE -</b>            Required Actions C.1 and C.2 do not apply when block valve is inoperable solely as a result of complying with Required Actions B.2 or E.2.            -----</p>	
	C.1 Place associated PORV in manual control.	1 hour
	<p><u>AND</u></p> <p>C.2 Restore block valve to OPERABLE status.</p>	72 hours
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3.	6 hours
	<p><u>AND</u></p> <p>D.2 Be in MODE 4.</p>	12 hours
E. Two [or three] PORVs inoperable and not capable of being manually cycled.	E.1 Close associated block valves.	1 hour
	<u>AND</u>	
	E.2 Remove power from associated block valves.	1 hour
	<u>AND</u>	
	E.3 Be in MODE 3.	6 hours
	<u>AND</u>	
	E.4 Be in MODE 4.	12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. More than one block valve inoperable.	<p>-----  <b>- NOTE -</b>  Required Actions F.1, F.2, and F.3 do not apply when block valve is inoperable solely as a result of complying with Required Actions B.2 or E.2.  -----</p>	
	F.1 Place associated PORVs in manual control.	1 hour
	<u>AND</u>	
	F.2 Restore one block valve to OPERABLE status [if three block valves are inoperable].	2 hours
	<u>AND</u>	
	F.3 [ Restore remaining block valve(s) to OPERABLE status.	72 hours ]
G. Required Action and associated Completion Time of Condition F not met.	G.1 Be in MODE 3.	6 hours
	<u>AND</u>	
	G.2 Be in MODE 4.	12 hours



**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	<p>-----</p> <p><b>- NOTES -</b></p> <p>1. Not required to be performed with block valve closed in accordance with the Required Actions of this LCO.</p> <p>2. Only required to be performed in MODES 1 and 2.</p> <p>-----</p> <p>Perform a complete cycle of each block valve.</p>	92 days
SR 3.4.11.2	<p>-----</p> <p><b>- NOTE -</b></p> <p>Only required to be performed in MODES 1 and 2.</p> <p>-----</p> <p>Perform a complete cycle of each PORV.</p>	[18] months
SR 3.4.11.3	[ Perform a complete cycle of each solenoid air control valve and check valve on the air accumulators in PORV control systems.	[18] months ]
SR 3.4.11.4	[ Verify PORVs and block valves are capable of being powered from emergency power sources.	[18] months ]

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.12 Low Temperature Overpressure Protection (LTOP) System

- LCO 3.4.12 An LTOP System shall be OPERABLE with a maximum of [one] [high pressure injection (HPI)] pump [and one charging pump] capable of injecting into the RCS and the accumulators isolated and one of the following pressure relief capabilities:
- a. Two power operated relief valves (PORVs) with lift settings within the limits specified in the PTLR,
  - [ b. Two residual heat removal (RHR) suction relief valves with setpoints  $\geq$  [436.5] psig and  $\leq$  [463.5] psig, ]
  - [ c. One PORV with a lift setting within the limits specified in the PTLR and one RHR suction relief valve with a setpoint  $\geq$  [436.5] psig and  $\leq$  [463.5] psig, ] or
  - d. The RCS depressurized and an RCS vent of  $\geq$  [2.07] square inches.

APPLICABILITY: MODE 4 when all RCS cold leg temperature is  $\leq$  [275°F] [LTOP arming temperature specified in the PTLR],  
MODE 5,  
MODE 6 when the reactor vessel head is on.

-----  
- NOTE -  
-----

Accumulator isolation is only required when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed by the P/T limit curves provided in the PTLR.  
-----

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Two or more [HPI] pumps capable of injecting into the RCS.	A.1 Initiate action to verify a maximum of [one] [HPI] pump is capable of injecting into the RCS.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. [ Two or more charging pumps capable of injecting into the RCS.	<p>B.1</p> <p>-----  <b>- NOTE -</b>  Two charging pumps may be capable of injecting into the RCS during pump swap operation for <math>\leq 15</math> minutes.  -----</p> <p>Initiate action to verify a maximum of [one] charging pump is capable of injecting into the RCS.</p>	Immediately ]
C. An accumulator not isolated when the accumulator pressure is greater than or equal to the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.	C.1 Isolate affected accumulator.	1 hour
D. Required Action and associated Completion Time of Condition [C] not met.	<p>D.1 Increase RCS cold leg temperature to <math>&gt; [275^{\circ}\text{F}]</math> [LTOP arming temperature specified in the PTLR].</p> <p><u>OR</u></p> <p>D.2 Depressurize affected accumulator to less than the maximum RCS pressure for existing cold leg temperature allowed in the PTLR.</p>	<p>12 hours</p> <p>12 hours</p>
E. One required RCS relief valve inoperable in MODE 4.	E.1 Restore required RCS relief valve to OPERABLE status.	7 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One required RCS relief valve inoperable in MODE 5 or 6.	F.1 Restore required RCS relief valve to OPERABLE status.	24 hours
G. Two required RCS relief valves inoperable.  <u>OR</u>  Required Action and associated Completion Time of Condition A, [B,] D, E, or F not met.  <u>OR</u>  LTOP System inoperable for any reason other than Condition A, [B,] C, D, E, or F.	G.1 Depressurize RCS and establish RCS vent of $\geq [2.07]$ square inches.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.12.1 Verify a maximum of [one] [HPI] pump is capable of injecting into the RCS.	12 hours
SR 3.4.12.2 [ Verify a maximum of one charging pump is capable of injecting into the RCS.	12 hours ]
SR 3.4.12.3 Verify each accumulator is isolated.	12 hours
SR 3.4.12.4 [ Verify RHR suction valve is open for each required RHR suction relief valve.	12 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
<p style="text-align: center;">----- - NOTE - Only required to be met when complying with LCO 3.4.12.b. -----</p>		
SR 3.4.12.5	Verify required RCS vent $\geq$ [2.07] square inches open.	12 hours for unlocked open vent valve(s)  <u>AND</u>  31 days for locked open vent valve(s)
SR 3.4.12.6	Verify PORV block valve is open for each required PORV.	72 hours
SR 3.4.12.7	[ Verify associated RHR suction isolation valve is locked open with operator power removed for each required RHR suction relief valve.	31 days ]
SR 3.4.12.8	<p style="text-align: center;">----- - NOTE - Not required to be performed until 12 hours after decreasing RCS cold leg temperature to <math>\leq</math> [275°F] [LTOP arming temperature specified in the PTLR]. -----</p> <p>Perform a COT on each required PORV, excluding actuation.</p>	31 days
SR 3.4.12.9	Perform CHANNEL CALIBRATION for each required PORV actuation channel.	[18] months

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

- a. No pressure boundary LEAKAGE,
- b. 1 gpm unidentified LEAKAGE,
- c. 10 gpm identified LEAKAGE,
- d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs), and
- e. [500] gallons per day primary to secondary LEAKAGE through any one SG.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
<u>OR</u>	<u>AND</u>	
Pressure boundary LEAKAGE exists.	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.13.1	<p style="text-align: center;">-----  <b>- NOTE -</b>            Not required to be performed in MODE 3 or 4 until            12 hours of steady state operation.            -----</p> <p>Verify RCS Operational leakage is within limits by            performance of RCS water inventory balance.</p>	72 hours
SR 3.4.13.2	Verify steam generator tube integrity is in accordance with the Steam Generator Tube Surveillance Program.	In accordance with the Steam Generator Tube Surveillance Program

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.14 Leakage from each RCS PIV shall be within limit.

APPLICABILITY: MODES 1, 2, and 3,  
MODE 4, except valves in the residual heat removal (RHR) flow path  
when in, or during the transition to or from, the RHR mode of  
operation.

#### ACTIONS

##### - NOTES -

1. Separate Condition entry is allowed for each flow path.
2. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit.	<p style="text-align: center;">----- - NOTE - Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.14.1 and be in the reactor coolant pressure boundary [or the high pressure portion of the system]. -----</p>	4 hours
	<p>A.1 Isolate the high pressure portion of the affected system from the low pressure portion by use of one closed manual, deactivated automatic, or check valve.</p> <p><u>AND</u></p>	



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	A.2 [ Isolate the high pressure portion of the affected system from the low pressure portion by use of a second closed manual, deactivated automatic, or check valve.	72 hours
	[or]  Restore RCS PIV to within limits.	72 hours ]
B. Required Action and associated Completion Time for Condition A not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 5.	36 hours
C. [ RHR System autoclosure interlock function inoperable.	C.1 Isolate the affected penetration by use of one closed manual or deactivated automatic valve.	4 hours ]

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.14.1</p> <hr/> <p style="text-align: center;">- NOTES -</p> <ol style="list-style-type: none"> <li>1. Not required to be performed in MODES 3 and 4.</li> <li>2. Not required to be performed on the RCS PIVs located in the RHR flow path when in the shutdown cooling mode of operation.</li> <li>3. RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided.</li> </ol> <hr/> <p>Verify leakage from each RCS PIV is equivalent to <math>\leq 0.5</math> gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure <math>\geq [2215]</math> psig and <math>\leq [2255]</math> psig.</p>	<p>In accordance with the Inservice Testing Program, and [18] months</p> <p><u>AND</u></p> <p>Prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months</p> <p><u>AND</u></p> <p>Within 24 hours following valve actuation due to automatic or manual action or flow through the valve</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.4.14.2 -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>[ Not required to be met when the RHR System autoclosure interlock is disabled in accordance with SR 3.4.12.7. ]</p> <p>-----</p> <p>Verify RHR System autoclosure interlock prevents the valves from being opened with a simulated or actual RCS pressure signal <math>\geq</math> [425] psig.</p>	<p>[18] months ]</p>
<p>SR 3.4.14.3 -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>[ Not required to be met when the RHR System autoclosure interlock is disabled in accordance with SR 3.4.12.7. ]</p> <p>-----</p> <p>Verify RHR System autoclosure interlock causes the valves to close automatically with a simulated or actual RCS pressure signal <math>\geq</math> [600] psig.</p>	<p>[18] months ]</p>

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.15 RCS Leakage Detection Instrumentation

LCO 3.4.15 The following RCS leakage detection instrumentation shall be OPERABLE:

- a. One containment sump (level or discharge flow) monitor,
- b. One containment atmosphere radioactivity monitor (gaseous or particulate), and
- [ c. One containment air cooler condensate flow rate monitor. ]

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

- NOTE -

LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required containment sump monitor inoperable.	A.1	Once per 24 hours
	<p style="text-align: center;">----- - NOTE - Not required until 12 hours after establishment of steady state operation. -----</p> <p>Perform SR 3.4.13.1.</p>	
	<p><u>AND</u></p> <p>A.2 Restore required containment sump monitor to OPERABLE status.</p>	30 days

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required containment atmosphere radioactivity monitor inoperable.	B.1.1 Analyze grab samples of the containment atmosphere.	Once per 24 hours
	<u>OR</u>	
	B.1.2 ----- - NOTE - Not required until 12 hours after establishment of steady state operation. -----	
	Perform SR 3.4.13.1.	Once per 24 hours
	[ <u>AND</u>	
	B.2.1 Restore required containment atmosphere radioactivity monitor to OPERABLE status.	30 days
	<u>OR</u>	
	B.2.2 Verify containment air cooler condensate flow rate monitor is OPERABLE.	30 days ]
C. [ Required containment air cooler condensate flow rate monitor inoperable.	C.1 Perform SR 3.4.15.1.	Once per 24 hours
	<u>OR</u>	
	C.2 ----- - NOTE - Not required until 12 hours after establishment of steady state operation. -----	
	Perform SR 3.4.13.1.	30 days ]

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. [ Required containment atmosphere radioactivity monitor inoperable.  <u>AND</u>  Required containment air cooler condensate flow rate monitor inoperable.	D.1      Restore required containment atmosphere radioactivity monitor to OPERABLE status.	30 days
	<u>OR</u>  D.2      Restore required containment air cooler condensate flow rate monitor to OPERABLE status.	30 days ]
E. Required Action and associated Completion Time not met.	E.1      Be in MODE 3.	6 hours
	<u>AND</u>  E.2      Be in MODE 5.	36 hours
F. All required monitors inoperable.	F.1      Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.15.1	Perform CHANNEL CHECK of the required containment atmosphere radioactivity monitor.	12 hours
SR 3.4.15.2	Perform COT of the required containment atmosphere radioactivity monitor.	92 days
SR 3.4.15.3	Perform CHANNEL CALIBRATION of the required containment sump monitor.	[18] months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.15.4	[ Perform CHANNEL CALIBRATION of the required containment atmosphere radioactivity monitor.	[18] months ]
SR 3.4.15.5	[ Perform CHANNEL CALIBRATION of the required containment air cooler condensate flow rate monitor.	[18] months ]

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.16 RCS Specific Activity

LCO 3.4.16      The specific activity of the reactor coolant shall be within limits.

APPLICABILITY:      MODES 1 and 2,  
MODE 3 with RCS average temperature ( $T_{avg}$ )  $\geq 500^{\circ}\text{F}$ .

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. DOSE EQUIVALENT I-131 $> 1.0 \mu\text{Ci/gm}$ .	<div style="text-align: center;">-----</div> <div style="text-align: center;"><b>- NOTE -</b></div> <div style="text-align: center;">LCO 3.0.4 is not applicable.</div> <div style="text-align: center;">-----</div>	
	A.1      Verify DOSE EQUIVALENT I-131 within the acceptable region of Figure 3.4.16-1.	Once per 4 hours
	<u>AND</u>  A.2      Restore DOSE EQUIVALENT I-131 to within limit.	48 hours
B. Gross specific activity of the reactor coolant not within limit.	B.1      Be in MODE 3 with $T_{avg} < 500^{\circ}\text{F}$ .	6 hours



ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met.</p> <p><u>OR</u></p> <p>DOSE EQUIVALENT I-131 in the unacceptable region of Figure 3.4.16-1.</p>	<p>C.1 Be in MODE 3 with <math>T_{avg} &lt; 500^{\circ}\text{F}</math>.</p>	<p>6 hours</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.16.1	Verify reactor coolant gross specific activity $\leq 100/\bar{E}$ $\mu\text{Ci/gm}$ .	7 days
SR 3.4.16.2	<p>-----</p> <p><b>- NOTE -</b></p> <p>Only required to be performed in MODE 1.</p> <p>-----</p> <p>Verify reactor coolant DOSE EQUIVALENT I-131 specific activity <math>\leq 1.0</math> <math>\mu\text{Ci/gm}</math>.</p>	<p>14 days</p> <p><u>AND</u></p> <p>Between 2 and 6 hours after a THERMAL POWER change of <math>\geq 15\%</math> RTP within a 1 hour period</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.4.16.3 -----</p> <p style="text-align: center;"><b>- NOTE -</b></p> <p>Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for <math>\geq 48</math> hours.</p> <p>-----</p> <p>Determine <math>\bar{E}</math> from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for <math>\geq 48</math> hours.</p>	<p>184 days</p>

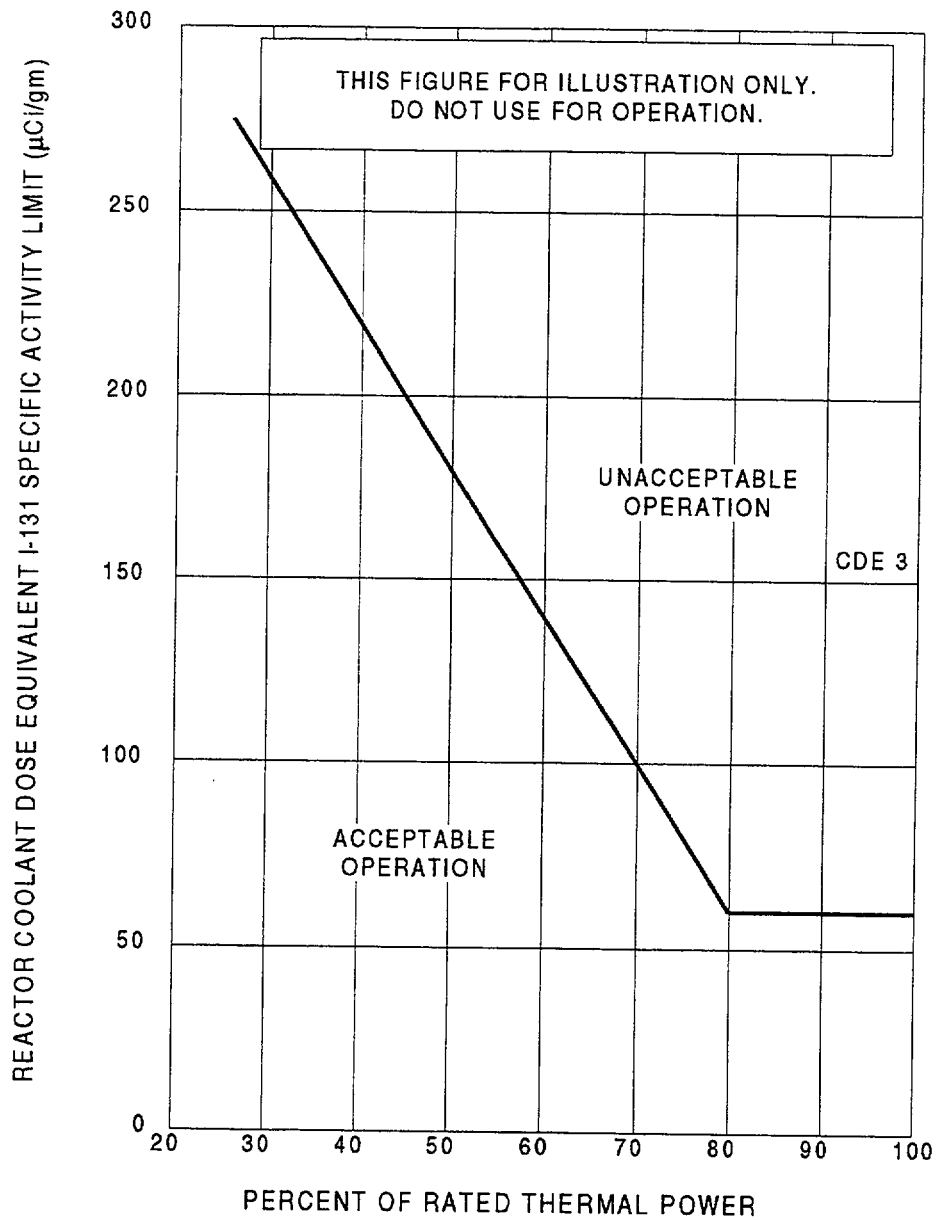


Figure 3.4.16-1 (page 1 of 1)  
Reactor Coolant DOSE EQUIVALENT I-131 Specific Activity  
Limit Versus Percent of RATED THERMAL POWER

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.17 RCS Loop Isolation Valves

LCO 3.4.17 Each RCS hot and cold leg loop isolation valve shall be open with power removed from each isolation valve operator.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

**- NOTE -**

Separate Condition entry is allowed for each RCS loop isolation valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Power available to one or more loop isolation valve operators.	A.1 Remove power from loop isolation valve operators.	30 minutes
B. ----- - NOTE - All Required Actions shall be completed whenever this Condition is entered. ----- One or more RCS loop isolation valves closed.	B.1 Maintain valve(s) closed.  <u>AND</u> B.2 Be in MODE 3.  <u>AND</u> B.3 Be in MODE 5.	Immediately  6 hours  36 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.17.1 Verify each RCS loop isolation valve is open and power is removed from each loop isolation valve operator.	31 days

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.18 RCS Isolated Loop Startup

LCO 3.4.18 Each RCS isolated loop shall remain isolated with:

- a. The hot and cold leg isolation valves closed if boron concentration of the isolated loop is less than boron concentration required to meet the SDM of LCO 3.1.1 or boron concentration of LCO 3.9.1 and
- b. The cold leg isolation valve closed if the cold leg temperature of the isolated loop is  $> [20]^{\circ}\text{F}$  below the highest cold leg temperature of the operating loops.

APPLICABILITY: MODES 5 and 6.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Isolated loop hot or cold leg isolation valve open with LCO requirements not met.	A.1	Immediately
	----- - NOTE - Only required if boron concentration requirement not met. ----- Close hot and cold leg isolation valves.	
	<u>OR</u>	Immediately
	A.2	
	----- - NOTE - Only required if temperature requirement not met. ----- Close cold leg isolation valve.	

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.4.18.1	Verify cold leg temperature of isolated loop is $\leq [20]^{\circ}\text{F}$ below the highest cold leg temperature of the operating loops.	Within 30 minutes prior to opening the cold leg isolation valve in isolated loop
SR 3.4.18.2	Verify boron concentration of isolated loop is greater than or equal to the boron concentration required to meet the SDM of LCO 3.1.1 or boron concentration of LCO 3.9.1.	Within 2 hours prior to opening the hot or cold leg isolation valve in isolated loop

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.19 RCS Loops - Test Exceptions

LCO 3.4.19 The requirements of LCO 3.4.4, "RCS Loops - MODES 1 and 2," may be suspended with THERMAL POWER < P-7.

APPLICABILITY: MODES 1 and 2 during startup and PHYSICS TESTS.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. THERMAL POWER ≥ P-7.	A.1 Open reactor trip breakers.	Immediately

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.19.1	Verify THERMAL POWER is < P-7.	1 hour
SR 3.4.19.2	Perform a COT for each power range neutron flux - low and intermediate range neutron flux channel and P-7.	Prior to initiation of startup and PHYSICS TESTS

### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.1 Accumulators

LCO 3.5.1 [Four] ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,  
MODE 3 with RCS pressure > [1000] psig.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours
B. One accumulator inoperable for reasons other than Condition A.	B.1 Restore accumulator to OPERABLE status.	1 hour
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	6 hours
	<u>AND</u> C.2 Reduce RCS pressure to ≤ [1000] psig.	12 hours
D. Two or more accumulators inoperable.	D.1 Enter LCO 3.0.3.	Immediately

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.5.1.1 Verify each accumulator isolation valve is fully open.	12 hours



SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.1.2	Verify borated water volume in each accumulator is $\geq$ [ 7853 gallons ( )% and $\leq$ 8171 gallons ( )%].	12 hours
SR 3.5.1.3	Verify nitrogen cover pressure in each accumulator is $\geq$ [385] psig and $\leq$ [481] psig.	12 hours
SR 3.5.1.4	Verify boron concentration in each accumulator is $\geq$ [1900] ppm and $\leq$ [2100] ppm.	<p>31 days</p> <p><u>AND</u></p> <p>-----</p> <p><b>- NOTE -</b> Only required to be performed for affected accumulators</p> <p>-----</p> <p>Once within 6 hours after each solution volume increase of <math>\geq</math> [ ] % of indicated level ([ ] gallons) that is not the result of addition from the refueling water storage tank</p>
SR 3.5.1.5	Verify power is removed from each accumulator isolation valve operator when RCS pressure is $\geq$ [2000] psig.	31 days

### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

-----  
**- NOTES -**  
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- [ 1. In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.
  2. In MODE 3, ECCS pumps may be made incapable of injecting to support transition into or from the Applicability of LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," for up to 4 hours or until the temperature of all RCS cold legs exceeds [375°F] [Low Temperature Overpressure Protection (LTOP) arming temperature specified in the PTLR plus [25]°F], whichever comes first. ]
- 

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable.	A.1 Restore train(s) to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 4.	12 hours
C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	C.1 Enter LCO 3.0.3.	Immediately

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE			FREQUENCY											
SR 3.5.2.1	<p>[ Verify the following valves are in the listed position with power to the valve operator removed.</p> <table><tr><td><u>Number</u></td><td><u>Position</u></td><td><u>Function</u></td></tr><tr><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr><tr><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr><tr><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr></table>	<u>Number</u>	<u>Position</u>	<u>Function</u>	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	12 hours ]
<u>Number</u>	<u>Position</u>	<u>Function</u>												
[ ]	[ ]	[ ]												
[ ]	[ ]	[ ]												
[ ]	[ ]	[ ]												
SR 3.5.2.2	Verify each ECCS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days												
SR 3.5.2.3	[ Verify ECCS piping is full of water.	31 days ]												
SR 3.5.2.4	Verify each ECCS pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program												
SR 3.5.2.5	Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	[18] months												
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	[18] months												
SR 3.5.2.7	<p>[ Verify, for each ECCS throttle valve listed below, each position stop is in the correct position.</p> <table><tr><td><u>Valve Number</u></td></tr><tr><td>[ ]</td></tr><tr><td>[ ]</td></tr><tr><td>[ ]</td></tr></table>	<u>Valve Number</u>	[ ]	[ ]	[ ]	[18] months ]								
<u>Valve Number</u>														
[ ]														
[ ]														
[ ]														
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	[18] months												

### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.3 ECCS - Shutdown

LCO 3.5.3 One ECCS train shall be OPERABLE.

**- NOTE -**

An RHR train may be considered OPERABLE during alignment and operation for decay heat removal if capable of being manually realigned to the ECCS mode of operation.

APPLICABILITY: MODE 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. [ Required ECCS residual heat removal (RHR) subsystem inoperable.	A.1 Initiate action to restore required ECCS RHR subsystem to OPERABLE status.	Immediately ]
B. Required ECCS [high head subsystem] inoperable.	B.1 Restore required ECCS [high head subsystem] to OPERABLE status.	1 hour
C. Required Action and associated Completion Time [of Condition B] not met.	C.1 Be in MODE 5.	24 hours

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	<p>The following SRs are applicable for all equipment required to be OPERABLE:</p> <p>[SR 3.5.2.1]      [SR 3.5.2.7]  [SR 3.5.2.3]      SR 3.5.2.8  SR 3.5.2.4</p>	In accordance with applicable SRs

### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.4 Refueling Water Storage Tank (RWST)

LCO 3.5.4 The RWST shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RWST boron concentration not within limits.  <u>OR</u>  RWST borated water temperature not within limits.	A.1 Restore RWST to OPERABLE status.	8 hours
B. RWST inoperable for reasons other than Condition A.	B.1 Restore RWST to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.  <u>AND</u>	6 hours
	C.2 Be in MODE 5.	36 hours

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	<p style="text-align: center;">-----  <b>- NOTE -</b>  [ Only required to be performed when ambient air temperature is &lt; [35]°F or &gt; [100]°F. ]  -----</p> <p>Verify RWST borated water temperature is <math>\geq</math> [35]°F and <math>\leq</math> [100]°F.</p>	24 hours
SR 3.5.4.2	Verify RWST borated water volume is $\geq$ [466,200 gallons ( )%].	7 days
SR 3.5.4.3	Verify RWST boron concentration is $\geq$ [2000] ppm and $\leq$ [2200] ppm.	7 days

### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.5 Seal Injection Flow

LCO 3.5.5 Reactor coolant pump seal injection flow shall be  $\leq$  [40] gpm with [centrifugal charging pump discharge header] pressure  $\geq$  [2480] psig and the [charging flow] control valve full open.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Seal injection flow not within limit.	A.1 Adjust manual seal injection throttle valves to give a flow within limit with [centrifugal charging pump discharge header] pressure $\geq$ [2480] psig and the [charging flow] control valve full open.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	<u>AND</u> B.2 Be in MODE 4.	12 hours



**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE	FREQUENCY
<p>SR 3.5.5.1</p> <p style="text-align: center;">----- - NOTE - Not required to be performed until 4 hours after the Reactor Coolant System pressure stabilizes at ≥ [2215 psig and ≤ 2255 psig]. -----</p> <p>Verify manual seal injection throttle valves are adjusted to give a flow within limit with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open.</p>	<p>31 days</p>

### 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

#### 3.5.6 Boron Injection Tank (BIT)

LCO 3.5.6 The BIT shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. BIT inoperable.	A.1 Restore BIT to OPERABLE status.	1 hour
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3. <u>AND</u>	6 hours
	B.2 Borate to an SDM equivalent to [1]% $\Delta k/k$ at 200°F. <u>AND</u>	6 hours
	B.3 Restore BIT to OPERABLE status.	7 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 4.	12 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.6.1	Verify BIT borated water temperature is $\geq [145]^{\circ}\text{F}$ .	24 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.6.2	[ Verify BIT borated water volume is $\geq$ [1100] gallons.	7 days ]
SR 3.5.6.3	Verify BIT boron concentration is $\geq$ [20,000] ppm and $\leq$ [22,500] ppm.	7 days

Containment (Atmospheric, Subatmospheric, Ice Condenser, and Dual)  
3.6.1

### 3.6 CONTAINMENT SYSTEMS

#### 3.6.1 Containment (Atmospheric, Subatmospheric, Ice Condenser, and Dual)

LCO 3.6.1                      Containment shall be OPERABLE.

APPLICABILITY:      MODES 1, 2, 3, and 4.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Containment inoperable.	A.1      Restore containment to OPERABLE status.	1 hour
B. Required Action and associated Completion Time not met.	B.1      Be in MODE 3.	6 hours
	<u>AND</u> B.2      Be in MODE 5.	36 hours

#### SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.1	Perform required visual examinations and leakage rate testing except for containment air lock testing, in accordance with the Containment Leakage Rate Testing Program.	In accordance with the Containment Leakage Rate Testing Program
SR 3.6.1.2	[ Verify containment structural integrity in accordance with the Containment Tendon Surveillance Program.	In accordance with the Containment Tendon Surveillance Program ]

### 3.6 CONTAINMENT SYSTEMS

#### 3.6.2 Containment Air Locks (Atmospheric, Subatmospheric, Ice Condenser, and Dual)

LCO 3.6.2 [Two] containment air lock[s] shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTIONS

##### - NOTES -

1. Entry and exit is permissible to perform repairs on the affected air lock components.
2. Separate Condition entry is allowed for each air lock.
3. Enter applicable Conditions and Required Actions of LCO 3.6.1, "Containment," when air lock leakage results in exceeding the overall containment leakage rate.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment air locks with one containment air lock door inoperable.	<h5>- NOTES -</h5> <ol style="list-style-type: none"> <li>1. Required Actions A.1, A.2, and A.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered.</li> <li>2. Entry and exit is permissible for 7 days under administrative controls [if both air locks are inoperable].</li> </ol>	1 hour
	A.1 Verify the OPERABLE door is closed in the affected air lock.	
	<u>AND</u>	

Containment Air Locks (Atmospheric, Subatmospheric, Ice Condenser, and Dual)  
3.6.2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	A.2 Lock the OPERABLE door closed in the affected air lock.	24 hours
	<p><u>AND</u></p> <p>A.3 -----</p> <p style="text-align: center;"><b>- NOTE -</b> Air lock doors in high radiation areas may be verified locked closed by administrative means.</p> <p>-----</p> <p>Verify the OPERABLE door is locked closed in the affected air lock.</p>	Once per 31 days
B. One or more containment air locks with containment air lock interlock mechanism inoperable.	<p>-----</p> <p style="text-align: center;"><b>- NOTES -</b></p> <p>1. Required Actions B.1, B.2, and B.3 are not applicable if both doors in the same air lock are inoperable and Condition C is entered.</p> <p>2. Entry and exit of containment is permissible under the control of a dedicated individual.</p> <p>-----</p> <p>B.1 Verify an OPERABLE door is closed in the affected air lock.</p> <p><u>AND</u></p>	1 hour

Containment Air Locks (Atmospheric, Subatmospheric, Ice Condenser, and Dual)  
3.6.2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.2 Lock an OPERABLE door closed in the affected air lock.	24 hours
	<p><u>AND</u></p> <p>B.3 -----  <b>- NOTE -</b>  Air lock doors in high radiation areas may be verified locked closed by administrative means.  -----</p> <p>Verify an OPERABLE door is locked closed in the affected air lock.</p>	Once per 31 days
C. One or more containment air locks inoperable for reasons other than Condition A or B.	C.1 Initiate action to evaluate overall containment leakage rate per LCO 3.6.1.	Immediately
	<p><u>AND</u></p> <p>C.2 Verify a door is closed in the affected air lock.</p>	1 hour
	<p><u>AND</u></p> <p>C.3 Restore air lock to OPERABLE status.</p>	24 hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3.	6 hours
	<p><u>AND</u></p> <p>D.2 Be in MODE 5.</p>	36 hours

Containment Air Locks (Atmospheric, Subatmospheric, Ice Condenser, and Dual)  
3.6.2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.2.1	<p style="text-align: center;">----- - NOTES - -----</p> <ol style="list-style-type: none"> <li>1. An inoperable air lock door does not invalidate the previous successful performance of the overall air lock leakage test.</li> <li>2. Results shall be evaluated against acceptance criteria applicable to SR 3.6.1.1.</li> </ol> <p style="text-align: center;">-----</p> <p>Perform required air lock leakage rate testing in accordance with the Containment Leakage Rate Testing Program.</p>	In accordance with the Containment Leakage Rate Testing Program
SR 3.6.2.2	[ Verify only one door in the air lock can be opened at a time.	24 months ]